

UNITED STATES AIR FORCE IERA

KC-10 Confined Space Technical Guidance Document

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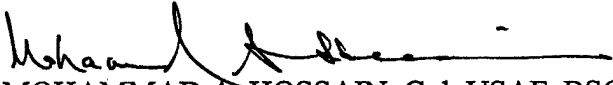
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KC-10 EXTENDER

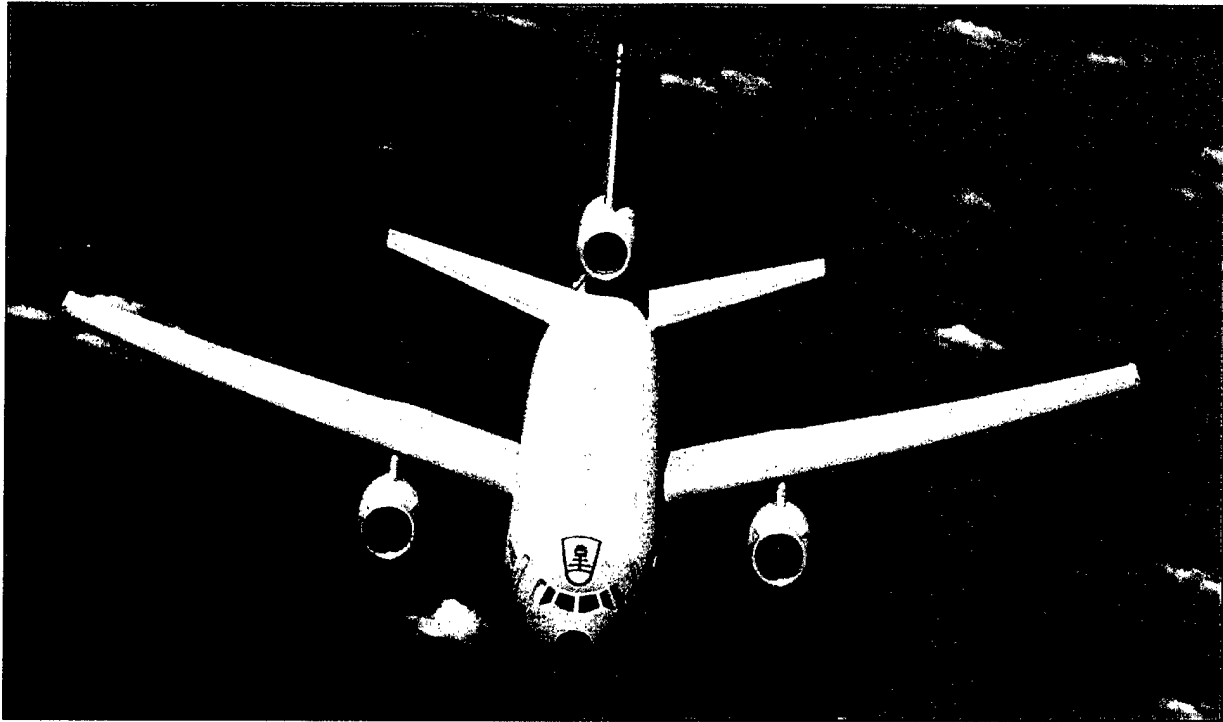


Figure 1. KC-10 Extender

INTRODUCTION

The Confined Space Technical Guidance Document is not a standardized compliance document. For specific compliance procedures, refer to AFOSH Standard 91-25, *Confined Spaces*; OSHA Standard 29 CFR 1910.146, *Permit-Required Confined Spaces*; and all other applicable AFOSH Standards, Technical Orders (TOs), and Operating Instructions (OIs). The following information and instructions apply to permit-required and nonpermit-required confined spaces associated with the KC-10 aircraft.

The majority of activities conducted within these spaces are for inspections and routine scheduled maintenance only. Flightline, depot, and other related activities are not referenced in this document. The information presented for each space type is based on the dimensions, inner characteristics, and interviews with shop personnel. Personnel performing aircraft maintenance and support are extensively trained in safe work practices, and work is conducted in accordance with (IAW) strict TO and OI directives. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of an aircraft. The following table, *KC-10 Space Classification*, lists the classification of each space assessed on the KC-10.

TABLE 1. KC-10 Space Classification

KC-10 Space Classification		
Space Type	Classification	Page Number
Integral Fuel Tanks [Left/Right]:	CP	5
• Inboard - #1/#3		10
• Tank #2		12
• Center Wing – Upper ¹		13
Integral Fuel Tanks [Left/Right]:	NC	15
• Outboard – #1/#3		
Fuel Cells [Left/Right]:	CP	17
• Forward Fuselage – #1, #2, #3		19
• Aft Fuselage – #4, #5, #6, #7		21
• Center Wing – Lower ¹		
Wheel Well:	NC	23
• Nose		26
• Center		29
• Left/Right		
Forward Accessory Compartment (FAC) [Avionics Compartment]	CS	32
Center Accessory Compartment (CAC)	CS	35
Aft Accessory Compartment	CS	38
Aft Fuselage Compartment	CS	41
Forward Pump House [Body Tank Access Compartment] [Fuselage Tank Access Compartment]	CS	44
Forward Lower Compartment [Pool Room]	CS	46
Air Conditioning Compartment	CS	49
Vertical Stabilizer	CS	51
Tail Cone Access	CS	53
Engine Intakes/Inlets:	CS	55
• #1 Left		
• #2 Center/Aft		
• #3 Right		
ARO (Air Refueling Operator) Maintenance Access Tunnel	CS	58
ARO (Air Refueling Operator) Compartment [Room]	NC	61
NOTE: CS = Confined Space, CP = Permit-Required Confined Space, NC = Not a Confined Space.		
¹ The “center wing fuel tank” is classified as two separate spaces. The upper area is an integral fuel tank referred to as the “center wing integral fuel tank – upper”, and the lower area is a fuel cell called the “center wing fuel cell – lower”.		

CLASSIFICATION CRITERIA

A space is classified as a "confined space" when it meets the criteria established by AFOSH Standard 91-25, *Confined Spaces*, and OSHA Standard 29 CFR 1910.146, *Permit-Required Confined Spaces*. ALL of the following criteria must be met in order to classified a space as a confined space:

- the space is large enough to bodily enter and perform work, and
- the space has a limited means of entry and egress, and
- the space is not designed for continuous employee occupancy.

For each confined space, only one of the following criteria must be met in order to classify a confined space as permit-required:

- contains or has the potential to contain a hazardous atmosphere, or
- contains a material that has the potential for engulfing the entrant, or
- has an internal configuration such that an entrant could be trapped or asphyxiated, or
- contains any other recognized serious safety or health hazards.

RECOMMENDED ATMOSPHERIC MONITORING

It is considered a good working practice to test the atmosphere in all confined spaces, both "permit required" and "non-permit required", prior to entry. The person designated to conduct atmospheric tests of confined spaces must be trained in operation, calibration, and maintenance of the testing equipment to include field calibration prior to each use. This may involve zero calibrating the instrument in clean air and using span gases for point calibrations. The atmospheric testing equipment must have a current calibration performed by the Test Measurement Diagnostic Equipment (TDME) lab or the manufacturer. The following atmospheric air monitoring must be conducted prior to permit-required confined space entries:

- **Oxygen (O₂):** The concentration of oxygen in the confined space must be greater than or equal to 19.5 percent and less than or equal to 23.5 percent.
- **Flammability:** The concentration of flammable or combustible vapors, gas, or mist in the confined space must be less than or equal to 10 percent of the Lower Explosive Limit (LEL).
- **Toxic Materials:** Atmospheric concentration of any chemical substance must be below that level which may cause death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects.

During normal operations, entries must not be conducted when immediately dangerous to life and health (IDLH) conditions exist. Exceptions to this rule are found in AFOSH Standard 91-25, *Confined Spaces*, paragraph 4.3.

KC-10 EXTENDER

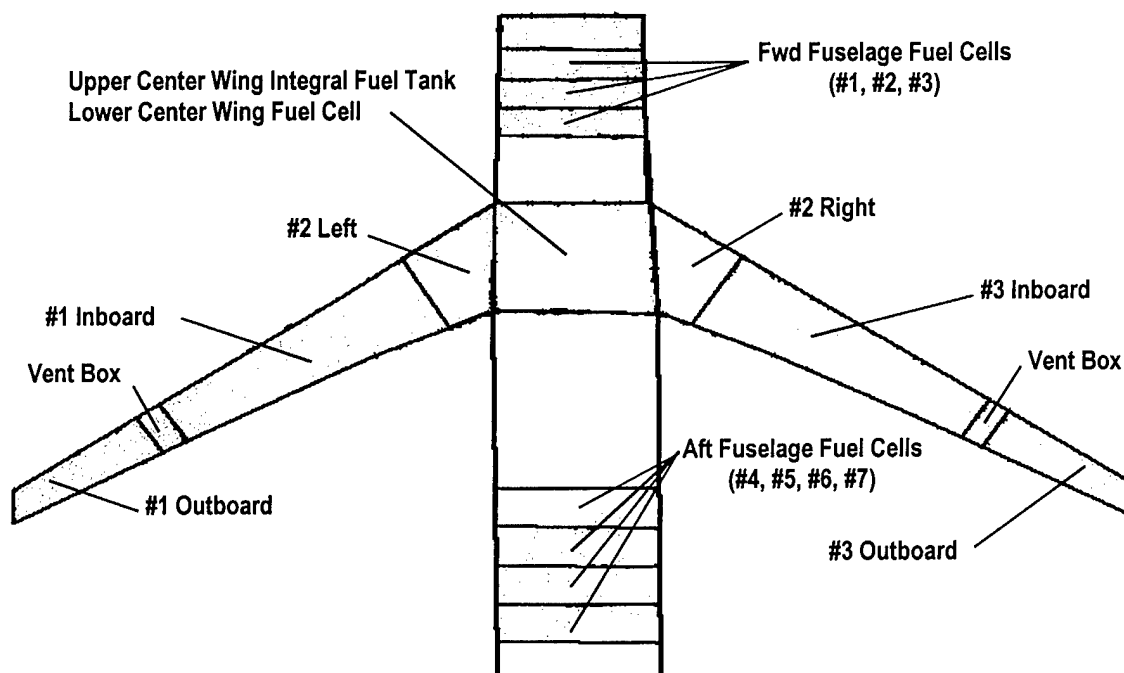
INTEGRAL FUEL TANKS & FUEL CELLS – GENERAL CONDITIONS & REQUIRED PROCEDURES

SPACE DESCRIPTION

The KC-10 aircraft contains 7 integral fuel tanks. Three are located on each wing, and one is located in the upper center wing area. The fuselage of the aircraft has three areas that contain fuel cells: the forward fuselage fuel cells (#1, #2, and #3), the aft fuselage fuel cells (#4, #5, #6, and #7), and the lower center wing fuel cell. Integral fuel tanks were developed because they offer the capacity of greater fuel containment with a decrease in weight over a fuel cell type construction. The integral fuel tanks are designed with seal planes instead of fuel bladders and foam (like the fuel cells) for retaining the fuel. Seal planes provide airtight dividers between the surrounding sides of the integral fuel tanks. They are sealed with gaskets, structural adhesives, elastic films, or other sealants. The fuel lines/components within the fuel cells are located between the inner wall of the fuel cell and the outside of the removable bladder that contains the fuel. The KC-10 integral fuel tanks and fuel cells can contain fuel lines, boost pumps, transfer valves/pumps, fire shutoff valves, check valves, fill shut-off valves, refuel valves, isolation valves, dump valves, fuel level control valves, overflow check valves, electrically operated valves, pressure refuel/defuel adapters, manifold drain pumps, etc.

Confined space entries into the integral fuel tanks and fuel cells are performed IAW TO 1-1-3, *Inspection and Repair of Aircraft Integral Tanks and Fuel Cells*, 30 November 1994. The TO includes the following information regarding integral fuel tanks and fuel cells:

- Entering integral fuel tanks and fuel cells that have been depuddled, purged, docked, and grounded.
- Identifies specific repair/rework procedures, equipment, and chemicals which are authorized for use during entries into integral fuel tanks and fuel cells.
- Outlines specific safety procedures such as ventilation, personal protective equipment, emergency equipment, etc.



TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers can enter the integral fuel tanks and fuel cells to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, Isochronal (ISO) Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. The following lists scheduled routine maintenance conducted predominantly by the Fuel Systems shop:

- Three integral fuel tanks per week are sealed on each aircraft. The process tanks 2 to 6 hours. First, the fuel tank is entered to visually locate leaks from the panel edges. The defective sealant is removed before the new sealant is installed. Each seam leak requires 1 to 3 ounces of Methyl Ethyl Ketone (MEK), 1 to 3 ounces of Primer-148, 2 to 6 ounces of Polysulfide sealant, and 12 ounces of Mold Release. This procedure is performed IAW TOs 1-1-3 and 1C-10(K)A-2-28-1.
- Fuel tank leak isolations are conducted three times per week on each aircraft. The process tanks 1 to 2 hours. Each leak isolation requires 1 to 3 ounces of MEK and two quarts of a leak detection compound. This procedure is performed IAW TO 1-1-3.

- Two to four fuel tank components are replaced per month on each aircraft. The process takes 2 to 8 hours. The components are boost pumps, transfer pumps, fuel manifolds, refuel valves, isolation valves, and dump valves. Each component replacement requires 1 to 2 ounces of MEK and 1 to 2 ounces of Petrolatum. This procedure is performed IAW TOs 1-1-3 and 1C-10(K)A-2-28-1.
- Three or four fuel cells are replaced per month on each aircraft. The process takes 48 to 96 hours per fuel cell. Each fuel cell replacement requires 1 to 2 ounces of MEK and 1 to 2 ounces of Petrolatum. This procedure is performed IAW TOs 1-1-3 and 1C-10(K)A-2-28-1.
- One or two fuel cells are repaired every month per aircraft. The process takes 8 hours for each fuel cell. Each fuel cell repair requires 1 to 2 ounces of MEK and 1 to 2 ounces of 82C32 Vithane Repair Kit. This procedure is performed IAW TOs 1-1-3, 1C-10(K)A-2-28-1, and manufacturer's instruction manual.

Only authorized materials, or materials which have been fully evaluated and approved by Installation Ground Safety (SEG), Installation Fire Department (CEF), and Bioenvironmental Engineering (BE) offices can be used within the integral fuel tanks and fuel cells. Hot work, such as grinding, welding or brazing in a permit-required confined space requires a confined space entry permit AND a hot work permit. Both permits must be reviewed and approved in writing by SEG, CEF, and BE prior to conducting any hot work in the space.

POTENTIAL HAZARDS

The following table, *Potential Hazards*, contains various hazards that could be encountered when performing permit-required confined space entries into the integral fuel tanks and fuel cells. The systems described in the table are closed/contained, and are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that are strictly complied with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TABLE 2. Potential Hazards (Integral Fuel Tanks & Fuel Cells-General)

POTENTIAL HAZARDS	
Hazard	Hazard Description
Combustibility	The integral fuel tanks and fuel cells have the potential to contain jet fuel and/or jet fuel vapors that are combustible.
Entrapment	The integral fuel tanks and fuel cells are extremely confined areas that contain several structural braces and fuel lines/pumps/valves throughout the space. This creates an entrapment hazard for entry personnel due to limited maneuverability and delayed egress.
Hazardous Materials Present	Jet fuel and/or fuel vapors may be present in various cavities of the space. Jet fuel and its constituents (e.g., benzene, toluene, xylene) can be a potential hazard to the entrant by route of inhalation, skin absorption, ingestion, and contact.
Introduction of Hazardous Materials	The solvents and cleaners used for cleaning, and adhesives used for sealing the tanks, could potentially include hazardous materials. Only authorized chemicals should be used within the integral fuel tanks and fuel cells.
Oxygen Deficiency	Oxygen deficiency caused by oxygen displacement is a potential hazard due to unfavorable ventilation and fuel vapors. In addition, several operations require the use of solvents, cleaners, and/or adhesives. Depending on the quantity and duration of use, the constituents of the chemicals could displace the oxygen within the space.
Temperature Extremes	Temperature extremes may present a hazard due to one or a combination of several factors such as ambient temperature, radiant heat, local winds, support equipment, and PPE.
Unfavorable Natural Ventilation	Due to the small entry access, there is normally minimal natural ventilation within the space.

RECOMMENDED ENGINEERING/ADMINISTRATIVE CONTROLS

The following engineering and administrative controls should be in place prior to making permit-required confined space entries into integral fuel tanks and fuel cells:

- **Depuddling:** Fuel tanks and fuel cells will be defueled, drained, depuddled, and purged to the extent necessary to perform the required tasks.
- **Electrical:** Except for specific depot exclusions, the aircraft electrical system shall be deenergized and locked and tagged out prior to opening integral fuel tanks and fuel cells. The aircraft should also be grounded and bonded prior to entry.
- **Lockout/Tagout:** Lockout/tagout procedures must be performed on electrical and mechanical systems prior to entry. Danger tags are placed on the relevant circuit breakers, batteries, and external power. Restricted areas are established to minimize foot traffic.

- **Ventilation:** Fuel tanks and fuel cells shall be ventilated for 30 minutes prior to space occupancy and continuously thereafter. Ventilation must be used as necessary to ensure safe atmospheric conditions during entry.
- **Administrative:** Personnel should minimize the time spent in confined spaces by performing only necessary tasks within the space. Any work that can be conducted outside of the space should not be performed during the entry.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE must be assigned based on the atmospheric conditions of the confined space, the physical hazards present, the task being performed, and the hazardous materials being used. Protective equipment that may be used for tasks in this space include:

- respiratory protection,
- non-absorbent coveralls,
- approved footwear,
- disposable nitrile or neoprene gloves,
- cap or head covering,
- goggles or safety glasses with side shields, and
- neoprene rubber knee pads, elbow pads, or mats.

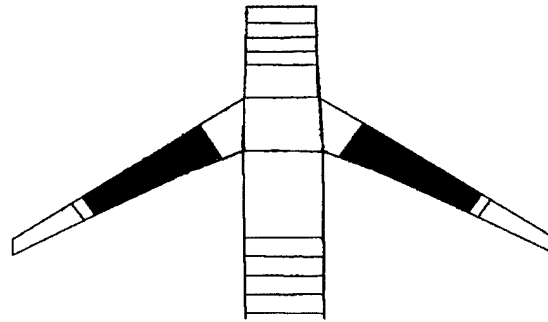
RECOMMENDED EMERGENCY EQUIPMENT

The following emergency equipment is recommended to be present in the Fuels or Flightline Maintenance area and verified to be in working condition by the designated entry authority prior to authorizing confined space entries:

- intrinsically safe hand radio,
- 150 pound halon fire extinguisher,
- intrinsically safe flashlights, lamps, or lanterns rated for class I, division 1 hazardous atmospheres,
- additional respiratory protection as recommended by BE, and
- rescue webbing harness.

KC-10 EXTENDER

INTEGRAL FUEL TANKS – INBOARD (1, 3)



SPACE DESCRIPTION

There is a single inboard integral fuel tank (1, 3) on each wing of the KC-10 aircraft (two tanks total) that can be entered completely by maintenance personnel. The inboard integral fuel tanks are main tanks that feed fuel to the engines. They are located between the outboard integral fuel tanks (1, 3) and the #2 integral fuel tanks. Each tank contains fuel lines, boost pumps, fire shutoff valves, fill pilots, pressure refuel/defuel adapters, engine fuel supply lines/system, cross feed components, and vent valves.

INNER DIMENSIONS

5,230 gallon capacity
Depth (top to bottom) = 1.5' to 3.0'

ENTRY DIMENSIONS

Side (port-hole): Length = 24.0" Width = 18.0"

Inboard Section:

Top (1): Length = 24.0" Width = 18.0"

Outboard Section:

Top (5): Length = 24.0" Width = 18.0"

Bottom (3): Length = 24.0" Width = 18.0"

(all entrances are oval)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

Each inboard integral fuel tank is divided into two sections (inboard and outboard). The two sections are separated by a side port-hole baffle (24.0" x 18.0"). The inboard section has a single top access at the inboard end of the space. The outboard section has five top entrances located at the middle and inboard end of the space. There are three bottom entrances at the outboard end of the tank.

RECOMMENDED CLASSIFICATION

Permit-required confined space.

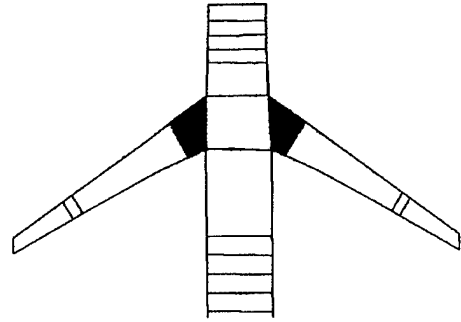
JUSTIFICATION FOR CLASSIFICATION

The inboard integral fuel tanks are permit-required due to the following conditions:

- contains or has the potential to contain a hazardous atmosphere (e.g., fuel and its constituents), and
- has an internal configuration such that an entrant could be trapped or asphyxiated (e.g., limited space congested with fuel lines/pumps/valves and support braces/ribs).

KC-10 EXTENDER

INTEGRAL FUEL TANKS – #2 (LEFT/RIGHT)



SPACE DESCRIPTION

There is a single #2 integral fuel tank (left/right) on each wing of the KC-10 aircraft (two tanks total) that can be entered completely by maintenance personnel. The #2 integral fuel tanks are between the inboard integral fuel tanks (1, 3) and the center wing fuel tanks (upper/lower). Each tank contains fuel lines, electrical auxiliary power unit (APU) start pumps, fire shutoff valves, boost pumps, fill pilots, engine fuel supply lines/system, and cross feed components.

INNER DIMENSIONS

4,850 gallon capacity
Depth (top to bottom) = 4.5' to 5.0'

ENTRY DIMENSIONS

Length = 24.0" Width = 18.0"
(oval entrance)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

Each #2 integral fuel tank has a single top access located in the middle of the space.

RECOMMENDED CLASSIFICATION

Permit-required confined space.

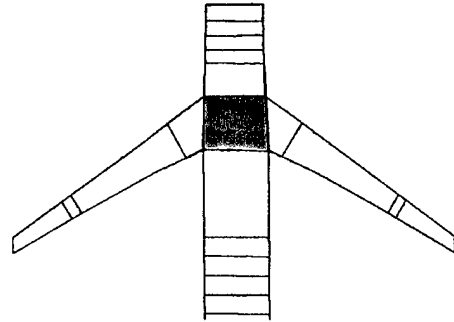
JUSTIFICATION FOR CLASSIFICATION

The #2 integral fuel tanks are permit-required due to the following conditions:

- contains or has the potential to contain a hazardous atmosphere (e.g., fuel and its constituents), and
- has an internal configuration such that an entrant could be trapped or asphyxiated (e.g., limited space congested with fuel lines/pumps/valves and support braces/ribs).

KC-10 EXTENDER

INTEGRAL FUEL TANKS – CENTER WING (UPPER)



SPACE DESCRIPTION

There is a center wing fuel tank area located between the wings of the KC-10 aircraft (roof of cargo bay) that can be entered completely by maintenance personnel. The space is divided into two separate tanks: the upper center wing integral fuel tank and the lower center wing fuel cell. The upper wing integral fuel tank contains fuel lines, fill shutoff valves, transfer valves, fill pilots, fuel transfer manifold, air-conditioning (AC) ducts, various electrical lines, and flight control cables.

INNER DIMENSIONS

13,000 gallon capacity
Depth (top to bottom) = 4.0' to 4.5'

ENTRY DIMENSIONS

Length = 24.0" Width = 18.0"
(oval entrance)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The upper center wing integral fuel tank contains a single bottom access located between the upper and lower center wing tank/cell. The space is accessed from inside the lower center wing fuel cell.

RECOMMENDED CLASSIFICATION

Permit-required confined space.

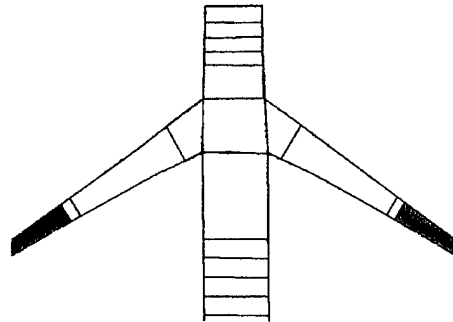
JUSTIFICATION FOR CLASSIFICATION

The upper center wing integral fuel tank is permit-required due to the following conditions:

- contains or has the potential to contain a hazardous atmosphere (e.g., fuel and its constituents), and
- has an internal configuration such that an entrant could be trapped or asphyxiated (e.g., limited space congested with fuel lines/pumps/valves, flight control cables, AC ducts, electrical lines, support braces/ribs).

KC-10 EXTENDER

INTEGRAL FUEL TANKS – OUTBOARD (1, 3)



SPACE DESCRIPTION

There is a single outboard integral fuel tank (1, 3) on each wing of the KC-10 aircraft (two tanks total) that cannot be completely entered by maintenance personnel. The outboard integral fuel tanks are main tanks that feed fuel to the engines. They are located at the wing tip, next to the inboard integral fuel tanks (1, 3). Each tank contains fuel lines, boost pumps, fire shutoff valves, fill pilots, pressure refuel/defuel adapters, engine fuel supply lines/system, cross feed components, and vent valves.

INNER DIMENSIONS

870 gallon capacity
Depth (top to bottom) = 1.0'

ENTRY DIMENSIONS

Side (port-hole): Length = 24.0" Width = 18.0"

Inboard Section:

Bottom (4): Length = 24.0" Width = 18.0"

Outboard Section:

Bottom (5): Length = 24.0" Width = 18.0"

(all entrances are oval)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

Each outboard integral fuel tank is divided into two sections (inboard and outboard). The sections are separated by a side port-hole baffle (24.0" x 18.0"). The inboard section has four bottom entrances; and the outboard section has five bottom entrances.

RECOMMENDED CLASSIFICATION

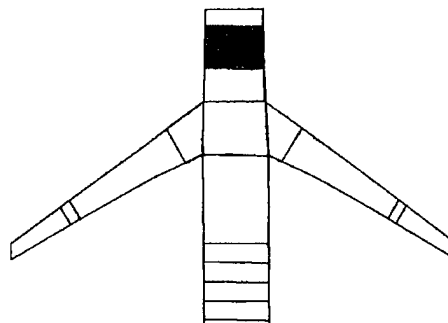
Not a confined space.

JUSTIFICATION FOR CLASSIFICATION

The outboard integral fuel tanks cannot be bodily entered due to the size and structural components. Therefore, it is not a confined space and not regulated IAW the AFOSH and OSHA confined space standards.

KC-10 EXTENDER

FUEL CELL – FORWARD FUSELAGE (1, 2, 3)



SPACE DESCRIPTION

The forward fuselage fuel cell area is divided into three sections (fuel cells) that can be entered completely by maintenance personnel. The space is located between the forward lower compartment ("Pool Room") and the forward pump house. The forward fuselage fuel cell contains fuel bladders, fuel lines, boost pumps, fill pilots, manifold drain, surge relief valves, and electrically operated valves.

INNER DIMENSIONS

8,250 gallon capacity
Depth (top to bottom) = 6.0'

ENTRY DIMENSIONS

Section #1:
Bottom: Length = 24.0" Width = 18.0"

Section #2:
Bottom: Length = 24.0" Width = 18.0"

Section #3:
Bottom: Length = 24.0" Width = 18.0"

(all entrances are oval)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The forward fuselage fuel cell area is divided into three evenly spaced sections (1, 2, and 3). The sections are connected with flapper valves that are too small to bodily pass between cells. Each section has a single bottom access located on the underbelly of the aircraft.

RECOMMENDED CLASSIFICATION

Permit-required confined space.

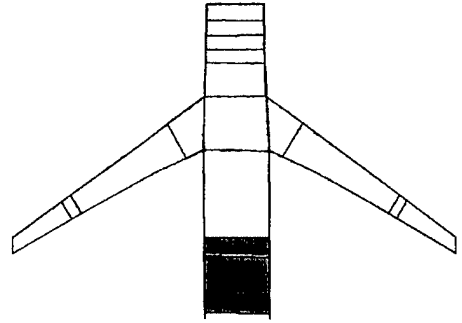
JUSTIFICATION FOR CLASSIFICATION

The forward fuselage fuel cells are permit-required due to the following conditions:

- contains or has the potential to contain a hazardous atmosphere (e.g., fuel and its constituents), and
- has an internal configuration such that an entrant could be trapped or asphyxiated (e.g., limited space congested with fuel lines/pumps/valves and support braces/ribs).

KC-10 EXTENDER

FUEL CELL – AFT FUSELAGE (4, 5, 6, 7)



SPACE DESCRIPTION

The aft fuselage fuel cell area is divided into four sections (fuel cells) that can be entered completely by maintenance personnel. The space is located aft of the center (main) wheel well on the underbelly of the aircraft. Each fuel cells contains fuel bladders, fuel lines, a flow meter, aerial refuel shutoff components, vacuum relief components, boost pumps, fill pilots, manifold drain, surge relief valves, and electrically operated valves.

INNER DIMENSIONS

9,870 gallon capacity
Depth (top to bottom) = 6.0'

ENTRY DIMENSIONS

Section #1:

Bottom: Length = 24.0" Width = 18.0"

Section #2:

Bottom: Length = 24.0" Width = 18.0"

Section #3:

Bottom: Length = 24.0" Width = 18.0"

Section #4:

Bottom: Length = 24.0" Width = 18.0"

(all entrances are oval)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The aft fuselage fuel cell area is divided into four evenly spaced sections (4, 5, 6, and 7). The sections are connected with flapper valves that are too small to bodily pass through. Each section has a single bottom access located on the underbelly of the aircraft.

RECOMMENDED CLASSIFICATION

Permit-required confined space.

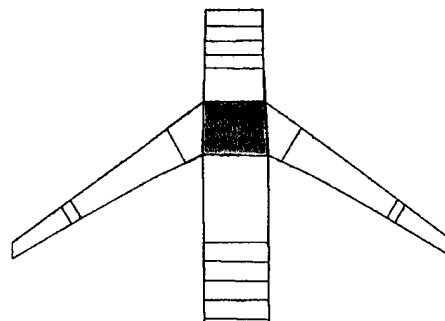
JUSTIFICATION FOR CLASSIFICATION

The aft fuselage fuel cells are a permit-required due to the following conditions:

- contains or has the potential to contain a hazardous atmosphere (e.g., fuel and its constituents), and
- has an internal configuration such that an entrant could be trapped or asphyxiated (e.g., limited space congested with fuel lines/pumps/valves and support braces/ribs).

KC-10 EXTENDER

INTEGRAL FUEL TANK – CENTER WING (LOWER)



SPACE DESCRIPTION

There is a center wing fuel area located between the wings of the KC-10 aircraft (roof of cargo bay) that can be entered completely by maintenance personnel. The space is divided into two separate tanks: the upper center wing integral fuel tank and the lower center wing fuel cell. The lower center wing fuel cell contains the fuel bladder, fuel lines, fuel boost pumps, air-conditioning (AC) ducts, various electrical lines, and flight control cables.

INNER DIMENSIONS

1,600 gallon capacity
Depth (top to bottom) = 1.0' to 2.5'

ENTRY DIMENSIONS

1. Top: Length = 24.0" Width = 18.0"
 2. Bottom: Length = 24.0" Width = 18.0"
- (both entrances are oval)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The upper center wing integral fuel tank contains a single top access located between the upper and lower center wing tank/cell. An additional entrance is located on the bottom of the space, on the underbelly of the aircraft.

RECOMMENDED CLASSIFICATION

Permit-required confined space.

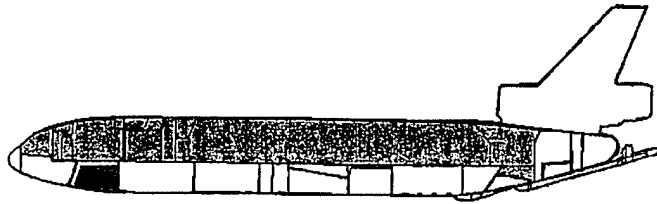
JUSTIFICATION FOR CLASSIFICATION

The lower center wing fuel cell is permit-required due to the following conditions:

- contains or has the potential to contain a hazardous atmosphere (e.g., fuel and its constituents), and
- has an internal configuration such that an entrant could be trapped or asphyxiated (e.g., limited space congested with fuel lines/pumps/valves, flight control cables, AC ducts, electrical lines, support braces/ribs).

KC-10 EXTENDER

WHEEL WELL AREA – NOSE/FORWARD



SPACE DESCRIPTION

The nose wheel well area is located near the nose/forward of the aircraft. The space contains the hydraulic landing gear, wheel and tire assembly, hydraulic brake system, electrical lines, hydraulic/nitrogen struts, steering cables, gear assembly, electrical landing gear lights, and hydraulic cargo door reservoir.

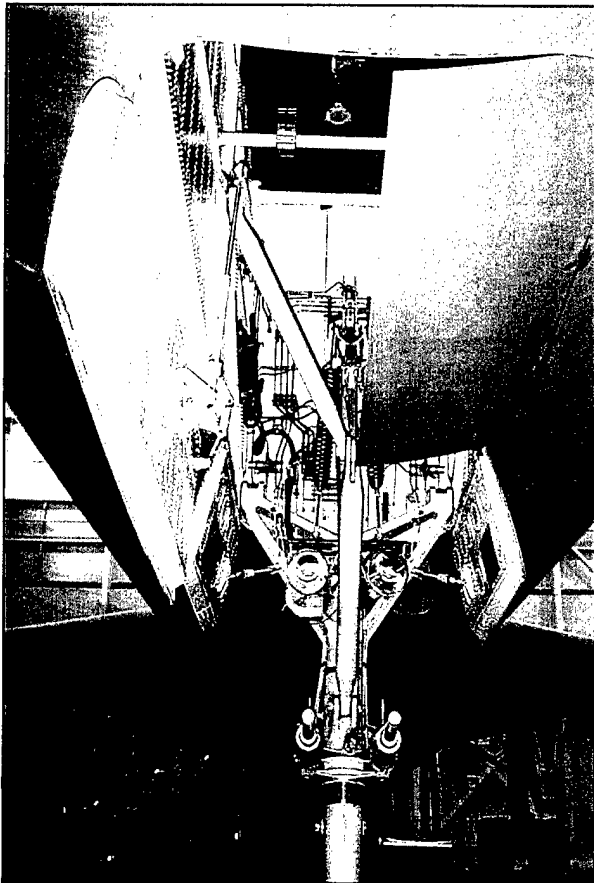


Figure 2. Nose Wheel Well: Bottom view facing aft wall.

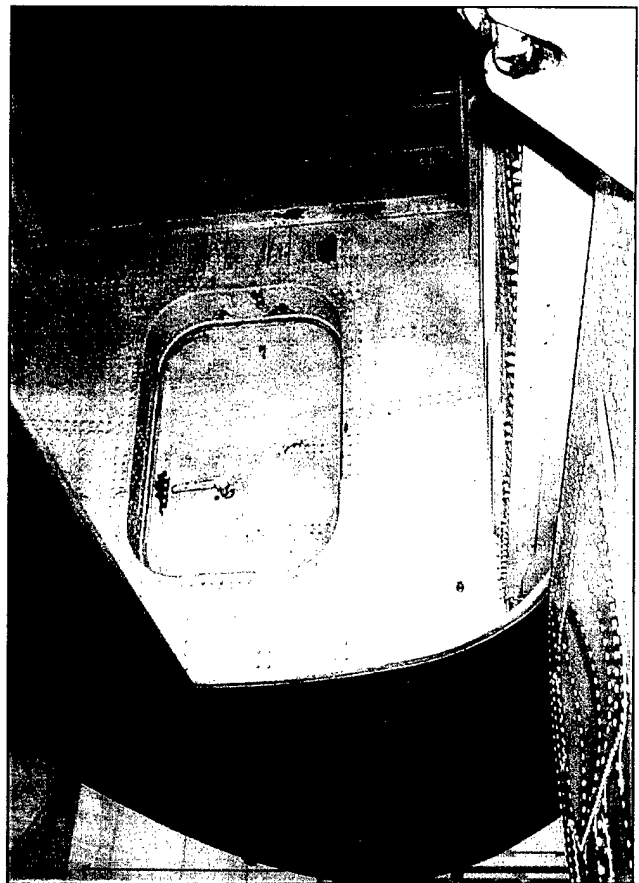


Figure 3. Nose Wheel Well: Inside facing forward wall. Access to forward accessory compartment (FAC).

INNER DIMENSIONS

Length (forward to aft) = 11.0'
Width (left to right) = 5.0'
Depth (top to bottom) = 5.5'

ENTRY DIMENSIONS

1. Length = 7.0'	Width = 2.5'
2. Length = 7.0'	Width = 2.5'
3. Length = 4.0'	Width = 2.0'
4. Length = 4.0'	Width = 2.0'
5. Length = 3.0'	Width = 2.0'

(all entrances are rectangular)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The nose wheel well has four bottom access panels. A pair of identical larger access panels is located at the forward end of the space; and a pair of identical smaller access panels is located at the aft end. The two smaller aft panels are connected to the landing gear. In addition, there is a side access on the forward wall leads to the forward access compartment (FAC).

RECOMMENDED CLASSIFICATION

Not a confined space.

JUSTIFICATION FOR CLASSIFICATION

The wheel well area does not have a limited means of entry and egress due to the size of the bottom entrances. Therefore, it is not a confined space and not regulated IAW the AFOSH and OSHA confined space standards.

TASKS PERFORMED WITHIN THE SPACE

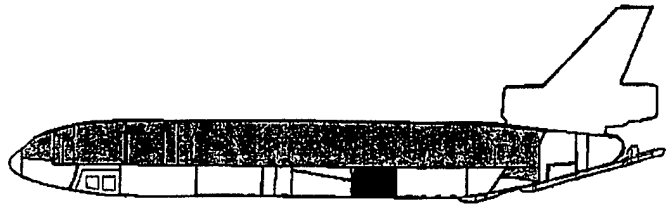
Personnel from several work centers can enter the wheel well to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. The following tasks and TOs are conducted within the nose wheel well area during scheduled and routine maintenance:

- The Guidance & Control shop replaces the following components: land spoiler arming switch, hydraulic temperature sensor, brake pedal brake transducer, flight data recorder accelerometer, flap limit duplex actuator, and various transmitters (e.g., brake pressure, inboard flap position, hydraulic quantity, hydraulic pressure). These tasks are performed IAW TOs 1C-10(K)A-06 Page 32-00-00, *Landing gear*, and 1C-10(K)A-06 Page 29-00-00, *Hydraulic Power*.
- The Hydraulic shop replaces the following components: hydraulic reservoir, hydraulic system manifold, dual brake control valve, brake system manifold, air eliminator, and aileron/spoiler mixer actuator. These tasks are performed IAW TOs 1C-10(K)A-06 Page 32-00-00, *Landing gear*, and 1C-10(K)A-06 Page 29-00-00, *Hydraulic Power*.
- The Electro/Environmental shop inspects, removes, and adjusts the landing gear sensors. This task is performed IAW TO 1C-10(K)A-06 Page 32-00-00, *Landing gear*.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the nose wheel well area.

KC-10 EXTENDER

WHEEL WELL AREA – CENTER



SPACE DESCRIPTION

The center wheel well area is located near the center of the aircraft, between the left and right wheel wells. The space contains the hydraulic landing gear, wheel and tire assembly, hydraulic brake system, two hydraulic reversible motor pumps, flight control cables/pulleys, fuel fill/shutoff valves, fuel lines, electrical lines, hydraulic/nitrogen struts, and gear assembly.

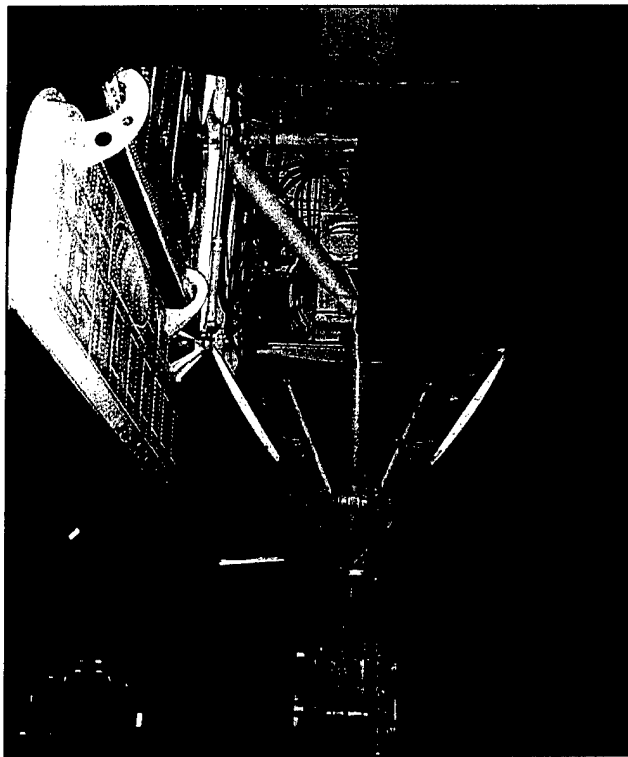


Figure 4. Center Wheel Well: Bottom view facing aft.

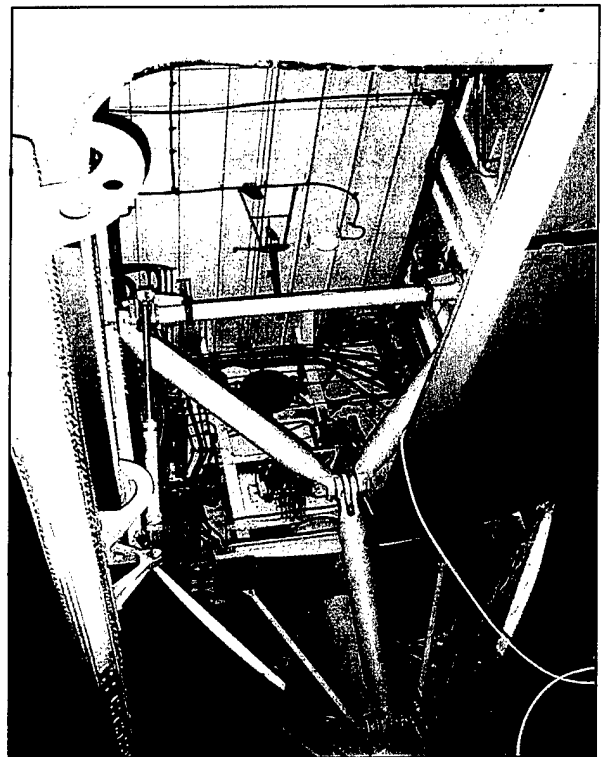


Figure 5. Center Wheel Well: Inside facing aft.

INNER DIMENSIONS

Length (forward to aft) = 12.0'
Width (left to right) = 6.5'
Depth (top to bottom) = 5.0'

ENTRY DIMENSIONS

1. Length = 8.0'	Width = 2.5'
2. Length = 8.0'	Width = 2.5'
3. Length = 4.0'	Width = 2.5'
4. Length = 4.0'	Width = 2.5'

(all entrances are rectangular)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The center wheel well has four bottom access panels. A pair of identical larger access panels is located at the forward end of the space; and a pair of identical smaller access panels is located at the aft end. The two smaller aft panels are connected to the landing gear.

RECOMMENDED CLASSIFICATION

Not a confined space.

JUSTIFICATION FOR CLASSIFICATION

The center wheel well area does not have a limited means of entry and egress due to the size of the bottom entrances. Therefore, it is not a confined space and not regulated IAW the AFOSH and OSHA confined space standards.

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers can enter the wheel well to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. The following tasks and TOs are conducted within the center wheel well area during scheduled and routine maintenance:

- The Guidance & Control shop replaces the following components: land spoiler arming switch, hydraulic temperature sensor, brake pedal brake transducer, flight data recorder accelerometer, flap limit duplex actuator, and various transmitters (e.g., brake pressure, inboard flap position, hydraulic quantity, hydraulic pressure). These tasks are performed IAW TOs 1C-10(K)A-06 Page 32-00-00, *Landing gear*, and 1C-10(K)A-06 Page 29-00-00, *Hydraulic Power*.

- The Hydraulic shop replaces the following components: hydraulic reservoir, hydraulic system manifold, dual brake control valve, brake system manifold, air eliminator, and aileron/spoiler mixer actuator. These tasks are performed IAW TOs 1C-10(K)A-06 Page 32-00-00, *Landing gear*, and 1C-10(K)A-06 Page 29-00-00, *Hydraulic Power*.
- The Electro/Environmental shop inspects, removes, and adjusts the landing gear sensors. This task is performed IAW TO 1C-10(K)A-06 Page 32-00-00, *Landing gear*.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the center wheel well area.

KC-10 EXTENDER

WHEEL WELL AREA – (LEFT/RIGHT)

Not Shown

(Located Under Wing of Aircraft)

SPACE DESCRIPTION

The left and right wheel well areas are located on the left and right sides of the center wheel well. The space contains the hydraulic landing gear, wheel and tire assembly, hydraulic brake system, two hydraulic reversible motor pumps, flight control cables/pulleys, fuel fill/shutoff valves, fuel lines, electrical lines, hydraulic/nitrogen struts, and gear assembly.

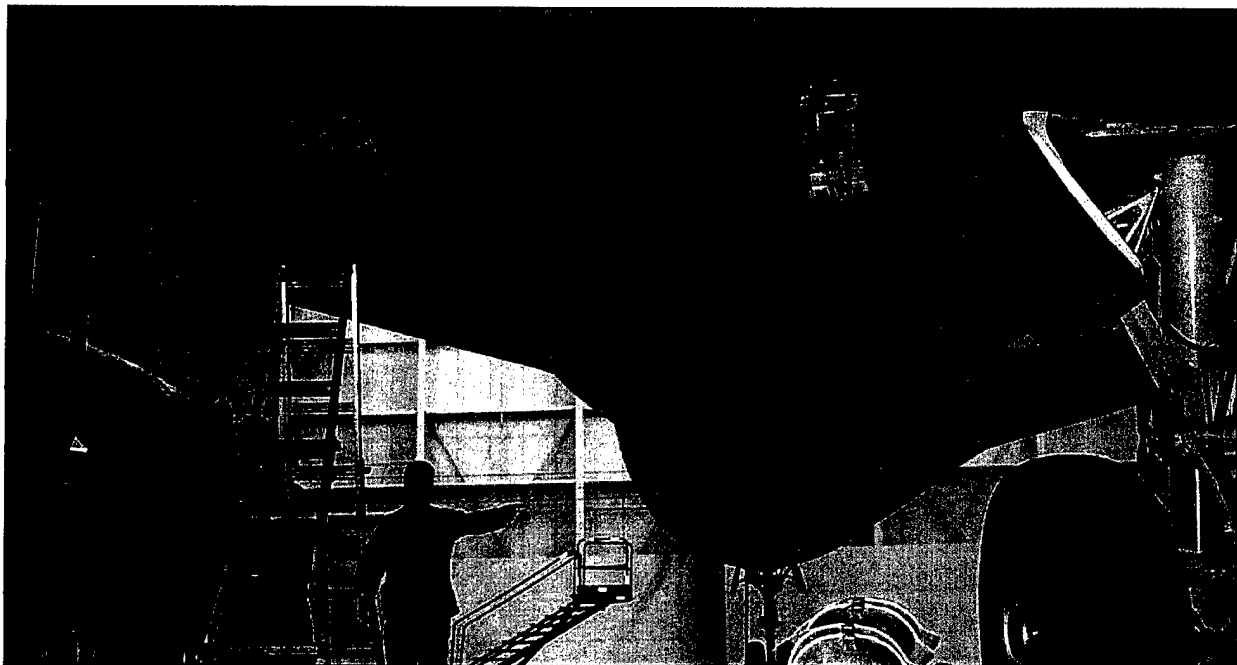


Figure 6. Left Wheel Well: Larger shut inboard panel (center of photograph); smaller open outboard panel connected to the landing gear (left side of photograph). Center wheel well shown on right side with the landing gear extended.

INNER DIMENSIONS

- | | | | |
|----------------------|----------------|--------------|--------------|
| 1. Inboard Section: | Length = 12.0' | Width = 6.0' | Depth = 6.0' |
| 2. Outboard Section: | Length = 6.0' | Width = 3.0 | Depth = 2.0' |

[The depth is the distance from the entrance to the most distant point.]

ENTRY DIMENSIONS

1. Inboard Section: Length = 10.5' Width = 5.5'
 2. Outboard Section: Length = 6.0' Width = 3.0'
- (all entrances are rectangular)

SPACE ACCESS/INNER AREA

The left and right wheel wells are each divided into two sections: the inboard and outboard. Each section has a single bottom access panel. The smaller outboard access panel is connected to the landing gear.

RECOMMENDED CLASSIFICATION

Not a confined space.

JUSTIFICATION FOR CLASSIFICATION

The left and right wheel well areas do not have a limited means of entry and egress due to the size of the bottom entrances. Therefore, they are not confined spaces and are not regulated IAW the AFOSH and OSHA confined space standards.

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers can enter the wheel well to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. The following tasks and TOs are conducted within the left and right wheel well areas during scheduled and routine maintenance:

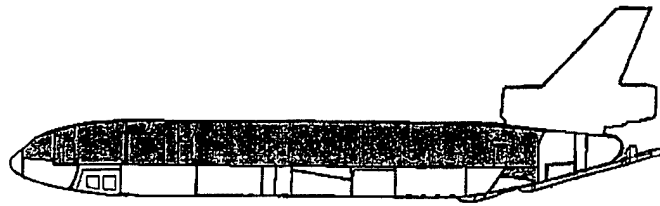
- The Guidance & Control shop replaces the following components: land spoiler arming switch, hydraulic temperature sensor, brake pedal brake transducer, flight data recorder accelerometer, flap limit duplex actuator, and various transmitters (e.g., brake pressure, inboard flap position, hydraulic quantity, hydraulic pressure). These tasks are performed IAW TOs 1C-10(K)A-06 Page 32-00-00, Landing gear, and 1C-10(K)A-06 Page 29-00-00, Hydraulic Power.

- The Hydraulic shop replaces the following components: hydraulic reservoir, hydraulic system manifold, dual brake control valve, brake system manifold, air eliminator, and aileron/spoiler mixer actuator. These tasks are performed IAW TOs 1C-10(K)A-06 Page 32-00-00, *Landing gear*, and 1C-10(K)A-06 Page 29-00-00, *Hydraulic Power*.
- The Electro/Environmental shop inspects, removes, and adjusts the landing gear sensors. This task is performed IAW TO 1C-10(K)A-06 Page 32-00-00, *Landing gear*.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the center wheel well area.

KC-10 EXTENDER

FORWARD ACCESSORY COMPARTMENT (FAC)



SPACE DESCRIPTION

The forward accessory compartment (FAC) is located in the underbelly, nose section, of the aircraft (below the cockpit and forward to the nose wheel well). The FAC contains avionics components, flight control cables, relay panels, low pressure air ducts, forward lavatory drain tube, and three inertial navigation system (INS) batteries.

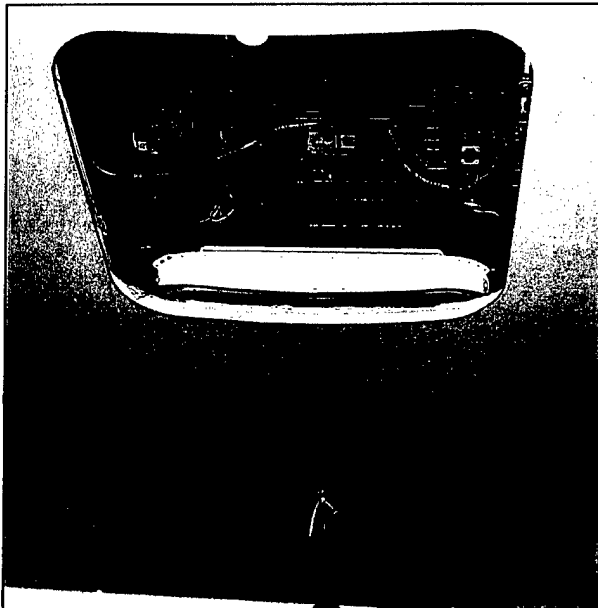


Figure 7. FAC: Bottom access from belly of aircraft (facing forward).

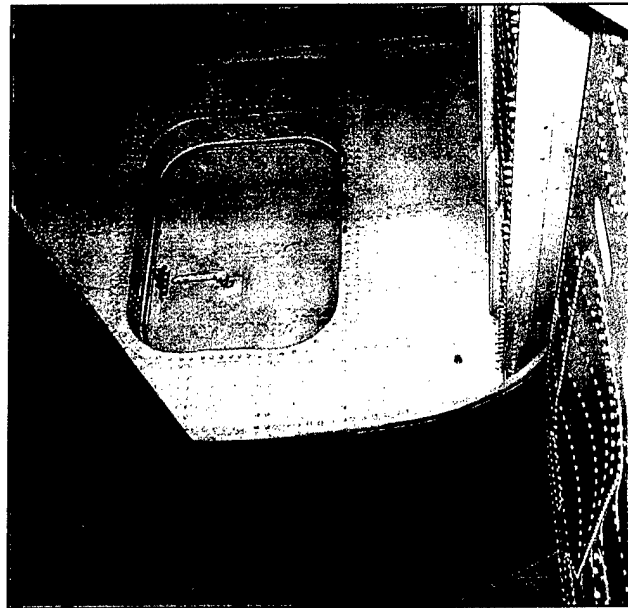


Figure 8. FAC: Side aft access from inside forward wall of nose wheel well.

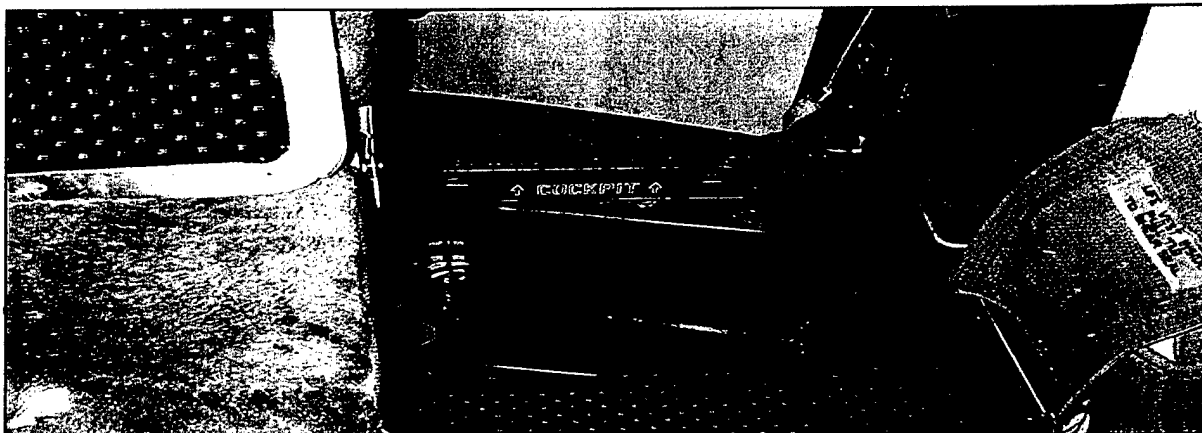


Figure 9. FAC: Top access from inside flight-deck.

INNER DIMENSIONS

Length (forward to aft) = 15.0'
Width (left to right) = Unknown
Height (top to bottom) = Unknown

ENTRY DIMENSIONS

1. Bottom: Length = 2.5' Width = 2.5'
 2. Side: Length = 3.0' Width = 2.0'
 3. Top: Length = 1.0' Width = 1.0'
- (all entrances are rectangular)

SPACE ACCESS/INNER AREA

The FAC has three rectangular entrances. The bottom entrance is an access panel located on the underbelly of the aircraft, aft to the nose wheel well. The side entrance is located inside the nose wheel well (on the forward wall). The top access is located on the floor of the flight-deck. The inner area is cone-shaped, tapering from the front of the nose wheel well to the back of the radome.

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., avionics components, flight control cables, relay panels, low pressure air ducts, forward lavatory drain tube, INS batteries) that are not CREDIBLE potential hazards and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs, which personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACE

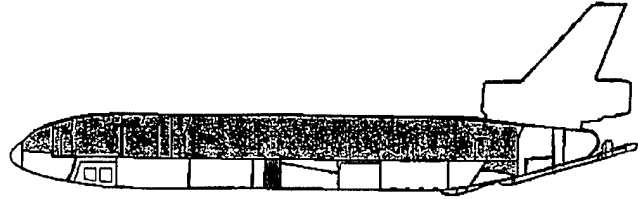
Personnel from several work centers may enter the FAC to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. Tasks described in the following TOs may be used within the FAC during scheduled and routine maintenance:

- The Guidance & Control shop replaces the following components: compass coupler, auto throttle duplex servo motor, ground sensing relays, fuel quantity power supply, flight data acquisition unit, inertial navigating unit, azimuth switching unit, flap handle position transmitter, etc. The following components are tested by the Guidance & Control shop: central aural warning unit, pilot tubes, pilot/static lines, various computers (e.g., yaw rate, auto throttle, auto pitch trim, central air data), etc. The above tasks are performed IAW TOs 1C-10(K)A-06 Page 27-00-00, *Flight Controls*, and 1C-10(K)A-06 Page 31-00-00, *Instruments*.
- The Jet Engine shop inspects, troubleshoots, and adjusts the throttle rig and engine trim equipment connections. These tasks are performed IAW TOs 1C-10(K)A-06 Page 76-00-00, *Engine Controls*, and 1C-10(K)A-06 Page 28-00-00, *Fuel System*.
- The Electro/Environmental shop inspects and replaces the following components: plug-in relays, remote control circuit breakers, transformer rectifiers, light dimmers, auto-spoiler units, fire detection controllers, etc. These tasks are performed IAW TOs 1C-10(K)A-06 Page 24-00-00, *Electrical Power*, and 1C-10(K)A-06 Page 26-00-00, *Fire Protection*.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the FAC.

KC-10 EXTENDER

CENTER ACCESSORY COMPARTMENT (CAC)



SPACE DESCRIPTION

The center accessory compartment (CAC) is located in the underbelly of the aircraft (between the forward pump house and the center wing fuel cell/tank area). The CAC contains two aircraft batteries, hydraulic lines, actuators, flight control cables/pulleys, high voltage relays, and bleed air ducts (6" diameter) from the auxiliary power unit (APU).

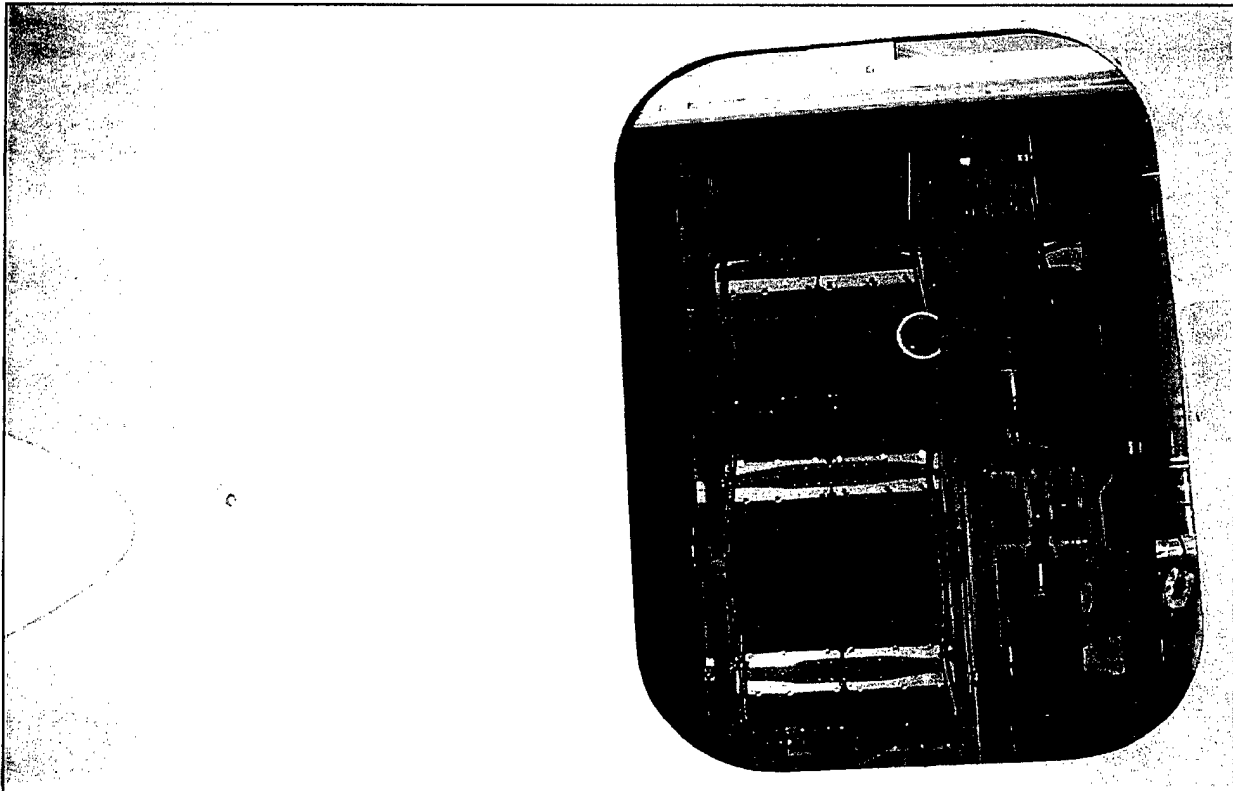


Figure 10. CAC: Bottom access from underbelly of aircraft.

INNER DIMENSIONS

Length (forward to aft) = 4.0'
Width (left to right) = 11.0'
Height (top to bottom) = 12.0'

ENTRY DIMENSIONS

1. Bottom: Length = 22.0" Width = 16.0"
2. Top: Length = 18.0" Width = 14.0"
(rectangular entrances)

SPACE ACCESS/INNER AREA

The CAC has two rectangular entrances. The bottom entrance is an access panel located on the underbelly of the aircraft, between the pump house and the center wing fuel/cell tanks. The top access is located in the cargo area of the aircraft.

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., aircraft batteries, hydraulic lines, actuators, flight control cables/pulleys, high voltage relays, bleed air ducts from APU) that are not CREDIBLE potential hazards and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers can enter the CAC to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. Tasks described in the following TOs may be used within the CAC during scheduled and routine maintenance:

- The Guidance & Control shop replaces and tests the clock system RCCB and the linear accelerometer units. The above tasks are performed IAW the following TOs:
 - 1C-10(K)A-06 Page 27-00-00, Flight Controls,*
 - 1C-10(K)A-06 Page 24-00-00, Electrical Power, and*
 - 1C-10(K)A-06 Page 31-00-00, Instruments.*

- The Electro/Environmental shop replaces and troubleshoots power relays, battery chargers, CAC cooling fan, and various controllers (e.g., generator, pneumatic, anti-skid). These tasks are performed IAW the following TOs:

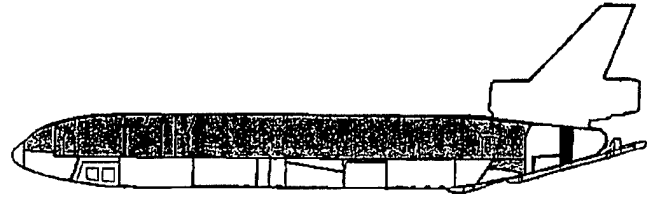
1C-10(K)A-06 Page 76-00-00, Engine Controls,
1C-10(K)A-06 Page 24-00-00, Electrical Power, and
1C-10(K)A-06 Page 27-00-00, Flight Controls.

- The Hydraulic shop troubleshoots and replaces radio altimeters, L-band transceiver circuit breakers, and service interphone jack. These tasks are performed IAW TO *1C-10(K)A-06 Page 24-00-00, Electrical Power.*

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the CAC.

KC-10 EXTENDER

AFT ACCESSORY COMPARTMENT



SPACE DESCRIPTION

The aft accessory compartment is located behind the aft fuselage compartment (in front of the tail cone and below the vertical stabilizer). The space contains auxiliary power unit (APU) exhaust ducts, a 6-gallon hydraulic reservoir, fuel lines, rudder/elevator cables/pulleys, and electrical conduit.

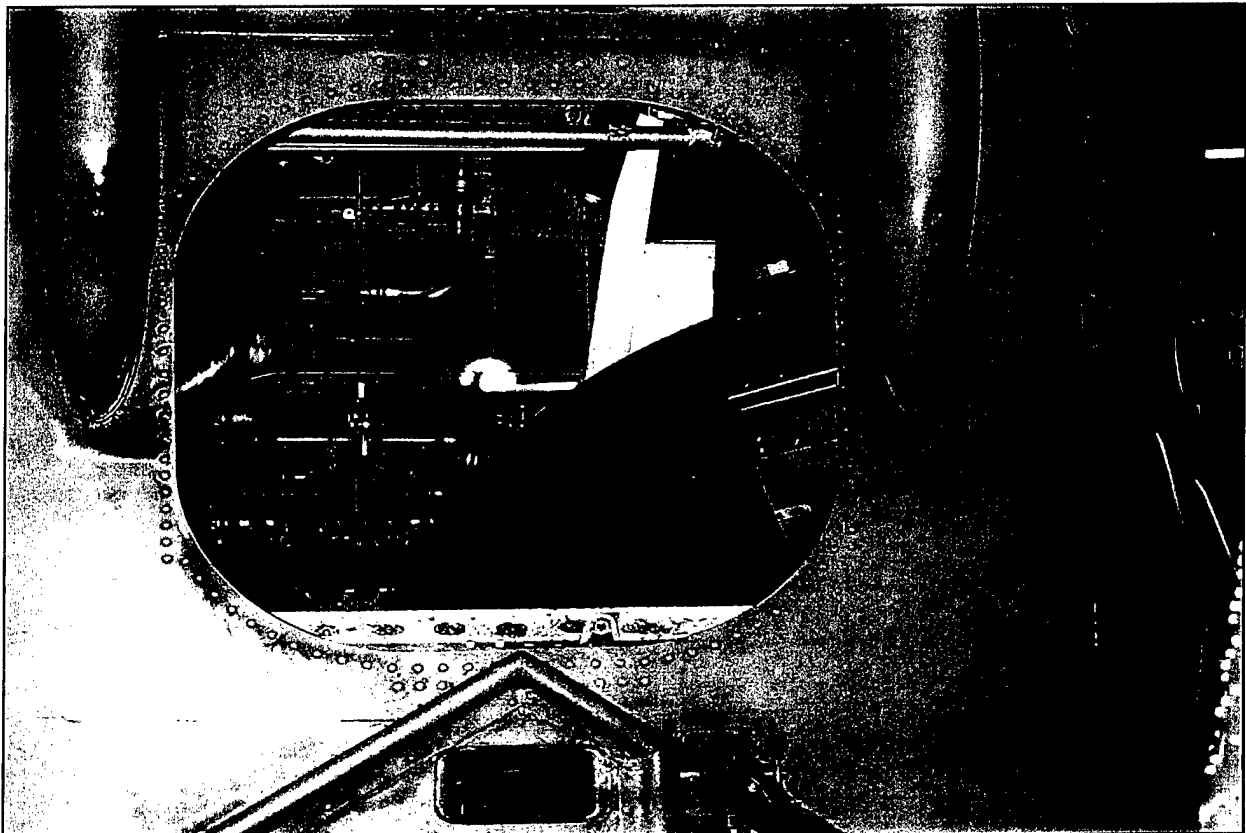


Figure 11. Aft Accessory Compartment: Bottom access from underbelly of aircraft.

INNER DIMENSIONS

Length (forward to aft) = 2.0'
Width (left to right) = 6.0'
Depth (top to bottom) = 15.0'

ENTRY DIMENSIONS

1. Bottom: Length = 21.0" Width = 20.0"
(rectangular entrance)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The aft accessory compartment has a single bottom access located underneath the aft area of the aircraft (forward to the tail cone).

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., APU exhaust ducts, a 6-gallon hydraulic reservoir, fuel lines, rudder/elevator cables/pulleys, electrical conduit) that are not CREDIBLE potential hazards and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers can enter the aft accessory compartment to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. Tasks described in the following TOs may be used within the aft accessory compartment during scheduled and routine maintenance:

- The Guidance & Control shop replaces the elf duplex actuators, hydraulic temperature sensors, and hydraulic pressure transmitters. The elf transmitters, elevator averaging LVDT, pitch trim LVDT, and the hydraulic quantity sensors are replaced and/or adjusted. The above tasks are performed IAW the following TOs:

*1C-10(K)A-06 Page 27-00-00, Flight Controls,
1C-10(K)A-06 Page 29-00-00, Hydraulic Power,
1C-10(K)A-06 Page 24-00-00, Electrical Power, and
1C-10(K)A-06 Page 31-00-00, Instruments.*

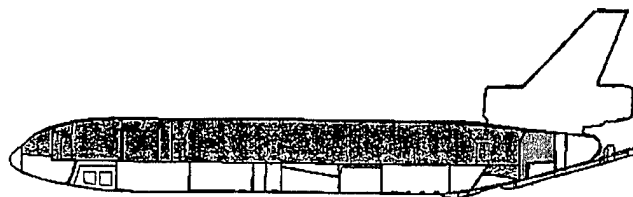
- The Jet Engine shop inspects and replaces/adjusts various #2 engine components (e.g., throttle rig, throttle, thrust reverser interlock, directional control switch). These tasks are performed IAW TOs 1C-10(K)A-06 Page 76-00-00, *Engine Controls*, and 1C-10(K)A-06 Page 24-00-00, *Electrical Power*.
- The Hydraulic shop inspects and replaces/adjusts #2 engine hydraulic fire wall valve, #2 system reservoir, #2 system reservoir, and non-reversible motor pump. These tasks are performed IAW the following TOs:

1C-10(K)A-06 Page 76-00-00, *Engine Controls*,
1C-10(K)A-06 Page 24-00-00, *Electrical Power*, and
1C-10(K)A-06 Page 29-00-00, *Hydraulic Power*.
- The Electro/Environmental shop inspects and replaces the electronic control box. This task is performed IAW TO 1C-10(K)A-06 Page 24-00-00, *Electrical Power*.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the aft accessory compartment.

KC-10 EXTENDER

AFT FUSELAGE COMPARTMENT



SPACE DESCRIPTION

The aft fuselage compartment is located in front of the aft accessory compartment and below the vertical stabilizer/engine #2. The space contains fuel lines, hydraulic lines, a non-reversible pump, aerial repair (AR) cables/pulleys, and a horizontal stabilizer inspection (HSI) panel.

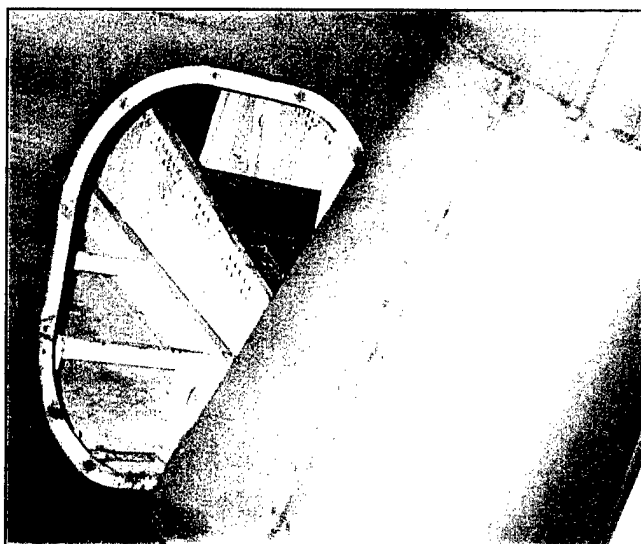


Figure 12. Aft Fuselage Compartment: Bottom underbelly access.

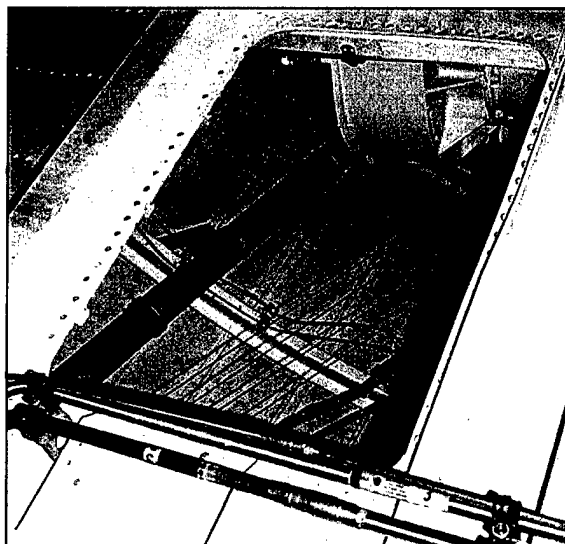


Figure 13. Aft Fuselage Compartment: Top access from inside boom hoist compartment.

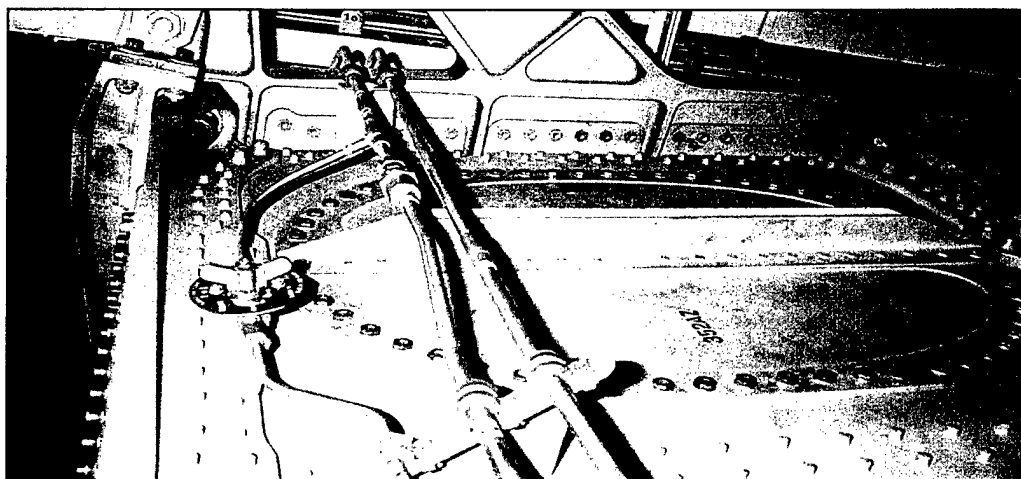


Figure 14. Aft Fuselage Compartment: Side aft access from inside aft HSI panel.

INNER DIMENSIONS

ENTRY DIMENSIONS

Length (forward to aft) = 2.0'
Width (left to right) = 2.5' to 7.0'
Height (top to bottom) = 15.0'

1. Bottom: Length = 21.0" Width = 20.0"
 2. Top: Length = 21.0" Width = 20.0"
 3. Side: Length = 21.0" Width = 20.0"
- (all entrances are rectangular)

SPACE ACCESS/INNER AREA

The aft fuselage compartment has three rectangular entrances. The bottom entrance is located underneath the aft end of the aircraft (exterior access panel). The top access is located inside the boom hoist compartment. The side entrance is located on the aft wall of the HSI panel. The inner shape of the space is irregular. The lower half of the space is 2.5' wide, and the upper half is approximately 7.0' wide.

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., fuel lines, hydraulic lines, a non-reversible pump, AR cables/pulleys, HSI panel) that are not CREDIBLE potential hazards and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers can enter the aft fuselage compartment to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. Tasks described in the following TOs may be used within the aft fuselage compartment during scheduled and routine maintenance:

- The Hydraulic shop replaces the non-reversible motor pump, horizontal stabilizer trim control valve/motor, and various boom hoist components (e.g., control valves, control balance relief valves, control cables, tension motor, cable assembly). The above tasks are performed IAW the following TOs:

1C-10(K)A-06 Page 27-00-00, Flight Controls,
1C-10(K)A-06 Page 24-00-00, Electrical Power, and
1C-10(K)A-06 Page 31-00-00, Instruments.

- The Jet Engine shop inspects and adjusts the throttle rig. This task is performed IAW TO *1C-10(K)A-06 Page 76-00-00, Engine Controls.*
- The Electro/Environmental shop troubleshoots and replaces the fire suppression components. This task is performed IAW TO *1C-10(K)A-06 Page 26-00-00, Fire Protection.*

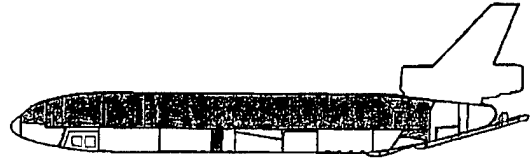
Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the aft fuselage compartment.

KC-10 EXTENDER

FORWARD PUMP HOUSE

[BODY TANK ACCESS COMPARTMENT]

[FUSELAGE TANK ACCESS COMPARTMENT]



SPACE DESCRIPTION

The forward pump house is referred to as the "body tank access compartment" and the "fuselage tank access compartment". It is located between the forward fuselage fuel cells and the center accessory compartment (CAC), along the underbelly of the aircraft. The space contains fuel valves, hydraulic air refueling valves/pumps, and various structural supports.

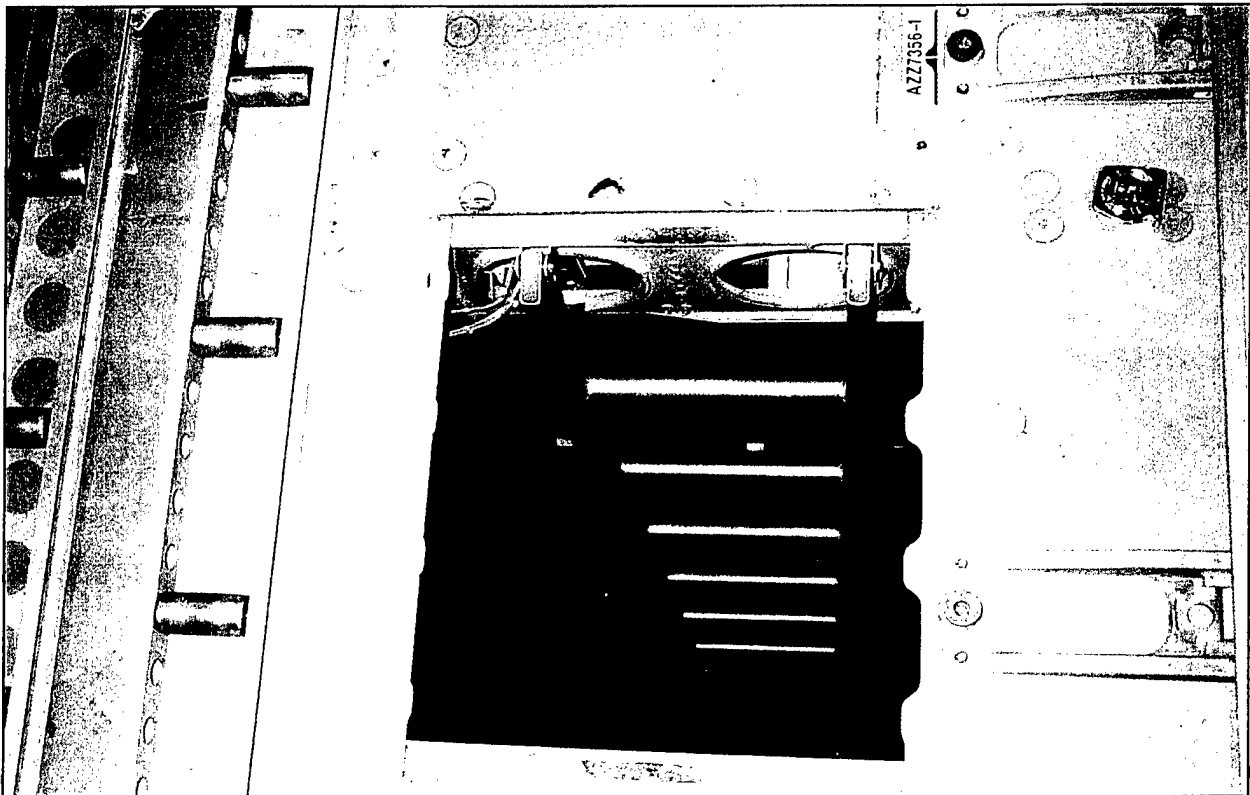


Figure 15. Forward Pump House: Top access from inside cargo area.

INNER DIMENSIONS

Length (forward to aft) = 3.5'
Width (left to right) = 18.5'
Height (top to bottom) = 8.5'

ENTRY DIMENSIONS

Top: Length = 18.0"
(rectangular entrance)

Width = 16.0"

SPACE ACCESS/INNER AREA

The forward pump house has a single top access located in the cargo area. The inner appearance of the space is "U"-shaped. The bottom of the "U" is the underbelly of the aircraft.

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., fuel valves, hydraulic air refueling valves/pumps) that are not CREDIBLE potential hazards and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACE

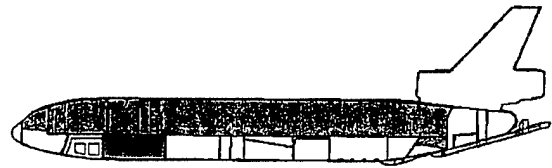
Personnel from several work centers can enter the forward pump house to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. Tasks described in the following TOs may be used within the forward pump house during scheduled and routine maintenance:

- The Hydraulic shop replaces the hydraulic piping IAW TO 1C-10(K)A-06 Page 29-00-00, *Hydraulic Power*.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the forward pump house.

KC-10 EXTENDER

FWD LOWER COMPARTMENT [POOL ROOM]



SPACE DESCRIPTION

The forward lower compartment is also referred to as the "pool room." The pool room is located between the nose wheel well and the forward fuselage fuel cells, along the underbelly of the aircraft. The space contains three high pressure aviation oxygen cylinders, a potable water tank, bleed air ducts, and high voltage antenna wires.

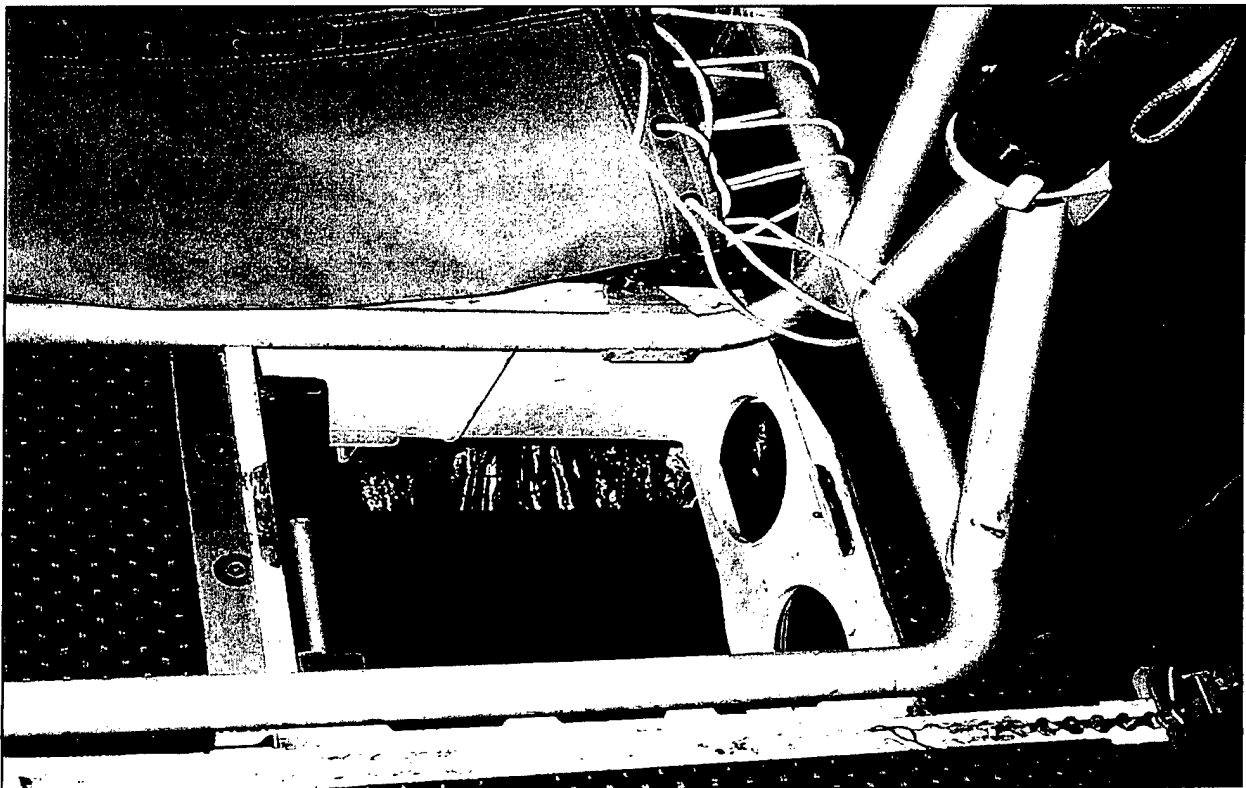


Figure 16. Forward Lower Compartment (Pool Room): Top access located in the passenger compartment.

INNER DIMENSIONS

Length (forward to aft) = 50.0'
Width (left to right) = 18.5'
Depth (top to bottom) = 8.5'

ENTRY DIMENSIONS

Top: Length = 18.0" Width = 16.0"
(rectangular entrance)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The pool room has a single top entrance located in the floor the passenger compartment floor. The inner area of the space is "U"-shaped. The bottom of the "U" is the underbelly of the aircraft.

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., high pressure aviation oxygen cylinders, potable water tank, bleed air ducts, and high voltage antenna wires) that are not CREDIBLE potential hazards and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers can enter the pool room to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. Tasks described in the following TOs may be used within the pool room during scheduled and routine maintenance:

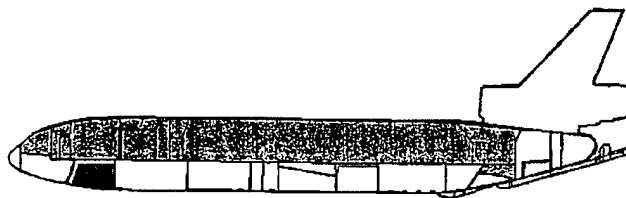
- The Guidance & Control shop replaces the static port heater, inspects/replaces the static line drain cans, and purges/replaces the alt static ports. These tasks are performed IAW TO 1C-10(K)A-06 Page 31-00-00, *Instruments*.
- The Hydraulic shop troubleshoots and replaces the engine pump relays and the boom impact pressure sensors. The above tasks are performed IAW TOs 1C-10(K)A-06 Page 24-00-00, *Electrical Power*, and 1C-10(K)A-06 Page 76-00-00, *Engine Controls*.

- The Electro/Environmental shop troubleshoots and replaces the oxygen bottles/regulators/valves, water supply components, anti-collision light components, antenna anti-ice valves, and power relays. These tasks are performed IAW TOs 1C-10(K)A-06 Page 31-00-00, *Instruments*, and 1C-10(K)A-06 Page 24-00-00, *Electrical Power*.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the pool room.

KC-10 EXTENDER

AIR CONDITIONING (AC) COMPARTMENT



SPACE DESCRIPTION

The air conditioning (AC) compartment provides clean air to the cargo/cockpit areas by reconditioning air from the auxiliary power unit (APU). It is located between the forward accessory compartment and the forward lower compartment (pool room), next to the nose wheel well. Part of the AC compartment is also located above the nose wheel well. The space contains an air conditioning pack (cycles air), ducts and insulation, and various electrical wires.

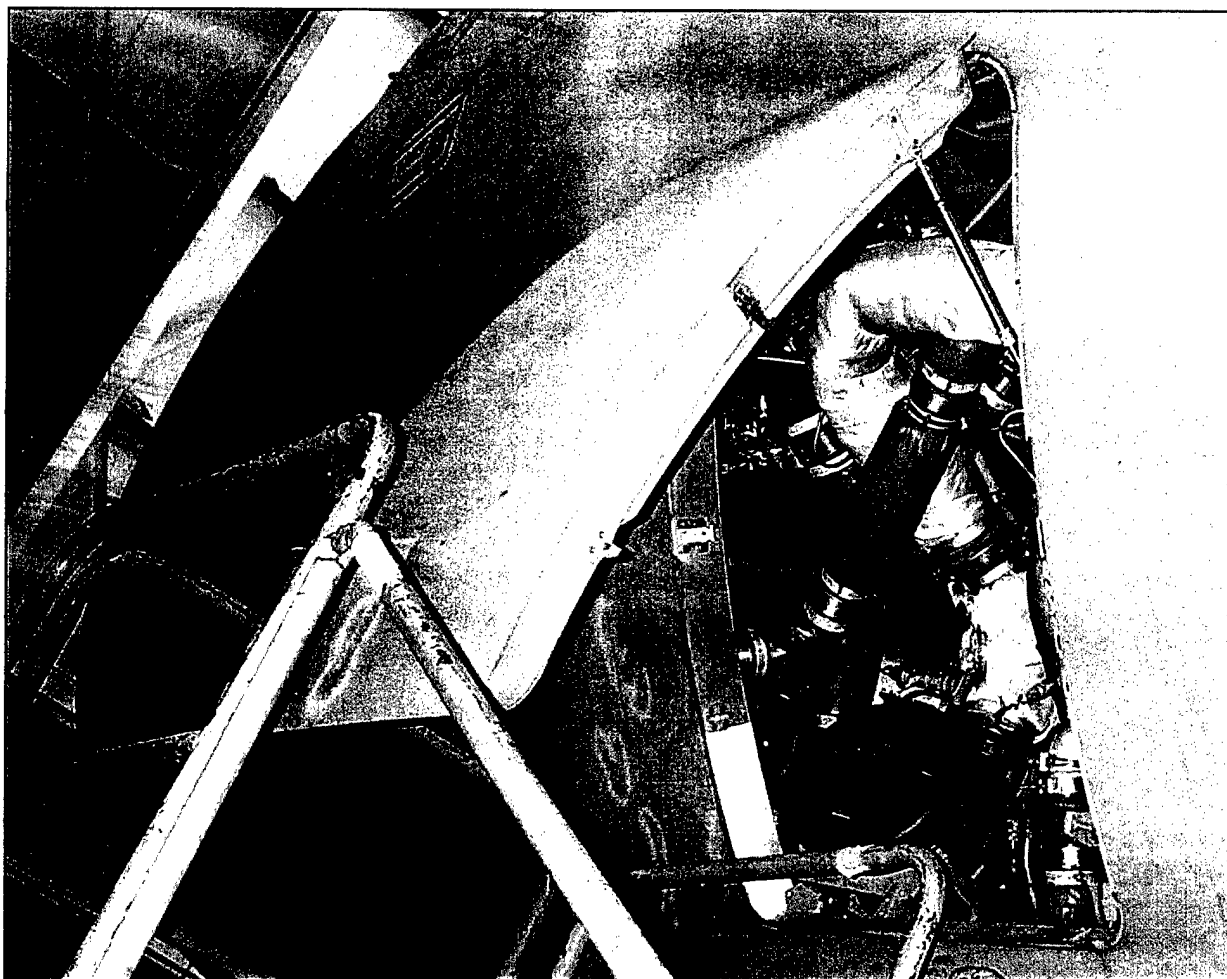


Figure 17. Air Conditioning (AC) Compartment: Side access panel near the nose of the aircraft.

INNER DIMENSIONS

Length (forward to aft) = 12.0'
Diameter = 3.0' to 4.0'

ENTRY DIMENSIONS

Side: Length = 18.0" Width = 16.0"
(rectangular entrance)

SPACE ACCESS/INNER AREA

The AC compartment has a single side entrance located on the exterior of the forward end of the aircraft (in front of the nose wheel well).

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., air conditioning pack [cycles air], ducts and insulation, and various electrical wires) that are not CREDIBLE potential hazards and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACE

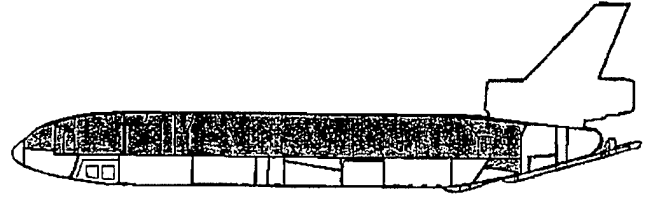
Personnel from several work centers can enter the AC compartment to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. Tasks described in the following TOs may be used within the AC compartment during scheduled and routine maintenance:

- TO 1C-10(K)A-06 Page 21-00-00, *Air Conditioning*.
- 1C-10(K)A-06 Page 31-00-00, *Instruments*.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the AC compartment.

KC-10 EXTENDER

VERTICAL STABILIZER



SPACE DESCRIPTION

The vertical stabilizer controls the rudder (left/right) motion of the aircraft. It is located in the tail section (empennage) of the aircraft. The vertical stabilizer contains hydraulic pitch trim actuator (PTA) lines, electrical PTA wires, electrical lights, flight control cables (elevator/rudder), and electrical empennage actuators.

INNER DIMENSIONS

Cannot be determined.

ENTRY DIMENSIONS

Cannot be determined.

SPACE ACCESS/INNER AREA

The vertical stabilizer is not conveniently accessed. Entry requires access through an entrance above the boom compartment, crawling through the #2 engine (opening the cowlings to squeeze around the inner engine components), and then entering an access panel on the top of the #2 engine cowl.

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., hydraulic PTA lines, electrical PTA wires, electrical lights, flight control cables [elevator/rudder], electrical empennage actuators) that are not CREDIBLE potential hazards and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACE

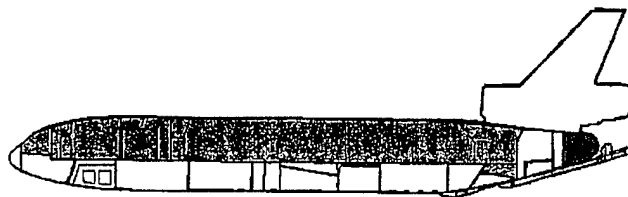
Personnel from several work centers can enter the vertical stabilizer to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. Tasks described in the following TOs may be used within the vertical stabilizer during scheduled and routine maintenance:

- 1C-10(K)A-06 Page 27-00-00, *Flight Controls*.
- 1C-10(K)A-06 Page 29-00-00, *Hydraulic Power*.
- 1C-10(K)A-06 Page 55-00-00, *Stabilizers*.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the vertical stabilizer.

KC-10 EXTENDER

TAIL CONE ACCESS



SPACE DESCRIPTION

The tail cone access is located at the aft end of the aircraft, below engine #2 and behind the aft accessory compartment. The space contains #2 engine hydraulic lines, rudder/tail hydraulic lines, fuel lines, auxiliary power unit (APU) air ducts, electrical lighting wires, and flight control cables/pulleys.

INNER DIMENSIONS

Length (forward to aft) = 10.0'
Depth (top to bottom) = 13.0'

ENTRY DIMENSIONS

Length = 16.0" Width = 16.0"
(square entrance)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The tail cone access has a single bottom entrance located on the underbelly of the aircraft. A ladder is used to access the space. The inner shape is like a horizontal cone. The curved portion of the cone is the aft end, and the flat side is the forward end.

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., #2 engine hydraulic lines, rudder/tail hydraulic lines, fuel lines, APU air ducts, electrical lighting wires, flight control cables/pulleys) that are not CREDIBLE potential hazards and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers can enter the tail cone access to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. Tasks described in the following TOs may be used within the tail cone access during scheduled and routine maintenance:

- 1C-10(K)A-06 Page 24-00-00, *Electrical Power*,
- 1C-10(K)A-06 Page 27-00-00, *Flight Controls*,
- 1C-10(K)A-06 Page 29-00-00, *Hydraulic Power*, and
- 1C-10(K)A-06 Page 76-00-00, *Engine Controls*.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the tail cone access.

KC-10 EXTENDER

ENGINE INTAKES/INLETS – LEFT/RIGHT (#1, #3) & CENTER (#2)

SPACE DESCRIPTION

The KC-10 has three engine intakes. Each wing has a single engine (#1 left and #3 right), and the third engine (#2 center) is located in the tail section below the vertical stabilizer. The space contains associated engine components (e.g., fuel lines, hydraulic lines, electrical wires, fan blades).



Figure 18. Engine Intakes: Right intake #3 (fwd view).
Center intake #2 (tail end).

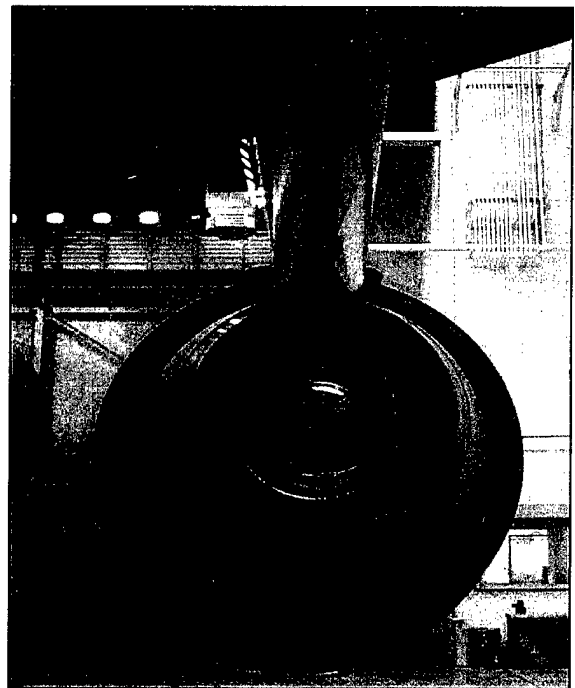


Figure 19. Engine Intake: Right intake #3 (aft view).



Figure 20. Engine Intake: Center intake #2 (right side view).

INNER DIMENSIONS

Left Intake #1:

Width (diameter) = 7.0'

Depth (forward to aft) = 14.0'

Center Intake #2:

Width (diameter) = 5.0'

Depth (forward to aft) = 20.0'

(Dimensions estimated)

Right Intake #3:

Width (diameter) = 7.0'

Depth (forward to aft) = 14.0'

ENTRY DIMENSIONS

1. Forward: Diameter = 7.0'

2. Aft: Diameter = 7.0'

(both entrances are circular)

1. Forward: Diameter = 5.0'

2. Aft: Diameter = 5.0'

(both entrances are circular)

1. Forward: Diameter = 7.0'

2. Aft: Diameter = 7.0'

(both entrances are circular)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The engine intakes are horizontal cylinder-shaped spaces that can be entered at both ends. A person cannot pass from end to end due to the engine components.

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The spaces contain a variety of closed/contained systems (e.g., engine system components) that are not CREDIBLE potential hazards and therefore are not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers can enter the engine intakes to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. Tasks described in the following TOs may be used within the engine intakes during scheduled and routine maintenance:

- The Guidance & Control shop tests the various sensors and replaces/adjusts/tests the EGT thermocouples/leads. These tasks are performed IAW TOs 1C-10(K)A-06 Page 76-00-00, *Engine Controls*, and 1C-10(K)A-06 Page 77-00-00, *Engine Indicating*.
- The Jet Engine shop inspects the #2 engine and lubes the #2 engine fan. Molly lube is used during the lubing process. The above tasks are performed IAW TOs 1C-10(K)A-06 Page 24-00-00, *Electrical Power*, and 1C-10(K)A-06 Page 76-00-00, *Engine Controls*.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the engine intakes.

KC-10 EXTENDER

ARO (AIR REFUELING OPERATOR) MAINTENANCE ACCESS TUNNEL

Not Shown
(Located in Middle of
Aircraft)

SPACE DESCRIPTION

The air refueling operator (ARO) maintenance access tunnel is located inside the ARO compartment (boom operator room) along the left side wall. It is between the aft fuselage fuel cells and the aft fuselage compartment, along the underbelly of the aircraft. The space contains fuel lines, various hydraulic lines, bleed air ducts from auxiliary power unit (APU), and electrical conduit.

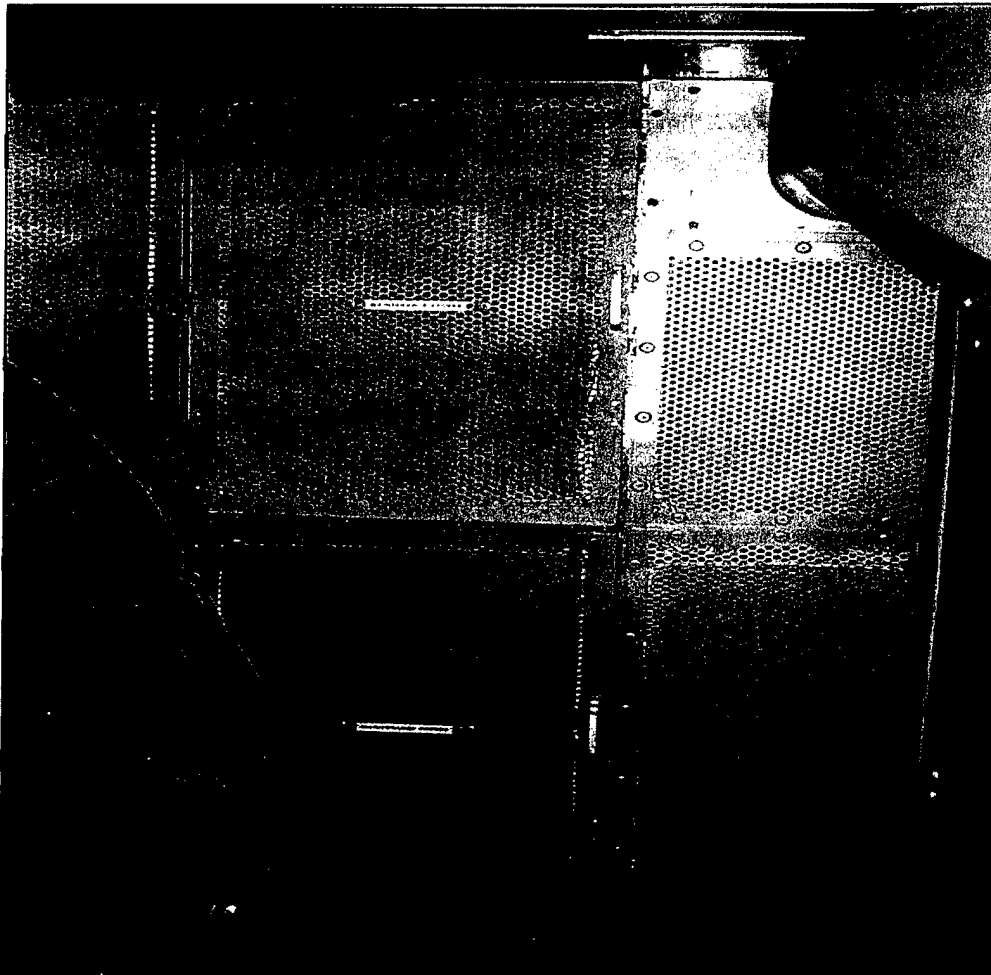


Figure 21. ARO Maintenance Access Tunnel: Two side entrances inside ARO compartment [boom operation room].

INNER DIMENSIONS

Length (forward to aft) = 9.0'
Height (top to bottom) = 5.0'
Depth (left to right) = 8.5'

ENTRY DIMENSIONS

1. Length = 4.5' Width = 20.0"
2. Length = 4.5' Width = 20.0"
(both entrances are rectangular)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The ARO maintenance access tunnel is similar to a crawlspace due to the length and confined area packed with various components. There are two identical side access panels located on the left wall of the ARO compartment.

RECOMMENDED CLASSIFICATION

Nonpermit-required confined space.

JUSTIFICATION FOR CLASSIFICATION

The space contains a variety of closed/contained systems (e.g., fuel lines, hydraulic lines, APU bleed air ducts, electrical conduit) that are not CREDIBLE potential hazards and therefore is not a permit-required confined space. The systems are hazardous if they are intentionally opened or a significant leak occurs. These conditions are unlikely due to personnel training and specific aircraft TOs and OIs that personnel are strictly required to comply with. The TOs and OIs govern procedures such as lockout/tagout and system checks prior to entering the various areas of the aircraft.

TASKS PERFORMED WITHIN THE SPACE

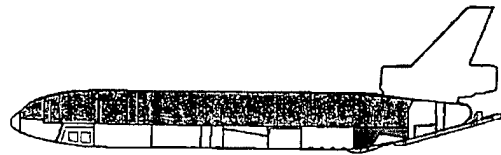
Personnel from several work centers can enter the ARO maintenance access tunnel to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. Tasks described in the following TOs may be used within the ARO maintenance access tunnel during scheduled and routine maintenance:

- The Electro/Environmental shop inspects, removes, and adjusts the light dimmers/reostats and plug-in relays. These tasks are performed IAW TOs 1C-10(K)A-06 Page 31-00-00, *Instruments*, and 1C-10(K)A-06 Page 24-00-00, *Electrical Power*.
- The Hydraulic shop replaces the drogue hose reel assembly, boom/drogue selector valve, hydraulic piping repair, and various cables (e.g., boom hoist, lock, hydraulic control). The above tasks are performed IAW the following TOs 1C-10(K)A-06 Page 24-00-00, *Electrical Power*, and 1C-10(K)A-06 Page 29-00-00, *Hydraulic Power*.

Only authorized materials, or materials that have been fully evaluated and approved by SEG, CEF, and BE offices can be used within the ARO maintenance access tunnel.

KC-10 EXTENDER

ARO (AIR REFUELING OPERATOR) COMPARTMENT [BOOM OPERATOR ROOM]



SPACE DESCRIPTION

The air refueling operator (ARO) compartment is the boom operator room. It is located between the aft fuselage fuel cells and the aft fuselage compartment, along the underbelly of the aircraft. The space contains the boom system components.

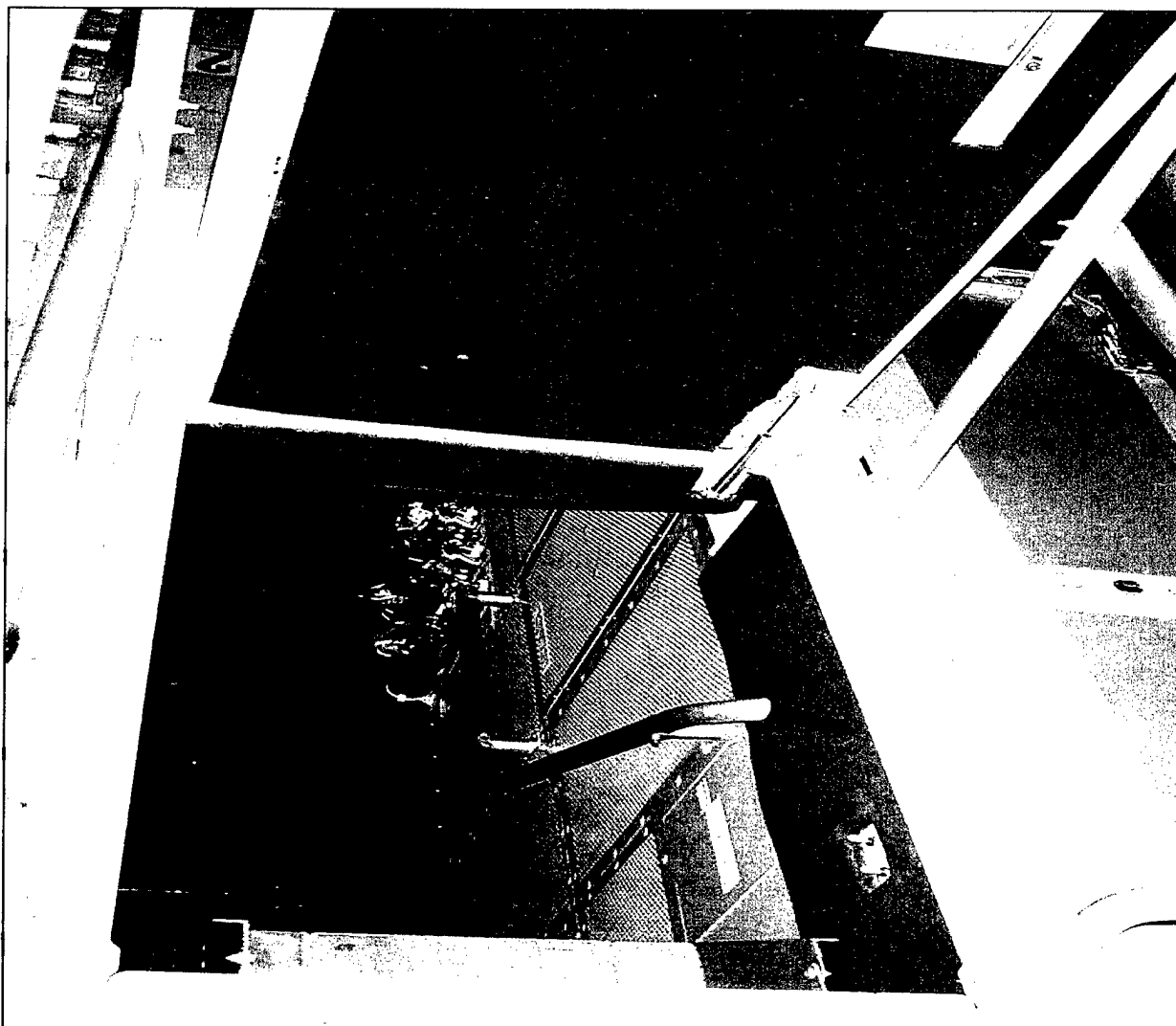


Figure 22. ARO compartment: Top access located in the aft cargo area.

INNER DIMENSIONS

Length (forward to aft) = 15.0'
Width (left to right) = 15.0'
Depth (top to bottom) = 10.0'

ENTRY DIMENSIONS

Length = 38.0" Width = 24.0"
(rectangular entrance)

[The depth is the distance from the entrance to the most distant point.]

SPACE ACCESS/INNER AREA

The ARO compartment has a single top access located on the floor of the cargo area (aft end).

RECOMMENDED CLASSIFICATION

Not a confined space.

JUSTIFICATION FOR CLASSIFICATION

Since the ARO compartment is designed for long-term human occupancy, it is not a confined space and therefore not regulated IAW the AFOSH and OSHA confined space standards.

TASKS PERFORMED WITHIN THE SPACE

Personnel from several work centers can enter the ARO compartment to perform both general and emergency maintenance activities. These work centers may include Aircraft Structural Repair, Non-Destructive Inspection Maintenance, ISO Dock, etc. The majority of activities conducted within this space are for inspections and routine scheduled maintenance only, and no chemicals are used. Flightline, depot, and other related activities are not referenced in this document. However, some tasks performed during aircraft structural repair and ISO Dock maintenance, may require the use of various solvents, cleaners, adhesives, paints, and primers. Tasks described in the following TOs may be used within the ARO compartment during scheduled and routine maintenance:

- The Electro/Environmental shop inspects, removes, and adjusts the light dimmers/reostats and plug-in relays. These tasks are performed IAW TOs 1C-10(K)A-06 Page 31-00-00, *Instruments*, and 1C-10(K)A-06 Page 24-00-00, *Electrical Power*.